THE IRON AGE

Established 1855 New York, March 13, 1913 *Vol. 91: No. 11*

Plant for Making Automobile Tool Boxes

New Cleveland Sheet Metal Working Shop for Turning Out Special Stampings and Automobile Accessories in Large Quantities

The recent completion of a new manufacturing plant by the Globe Machine & Stamping Company, Cleveland, Ohio, was a step in the development of a concern the growth of which during the past few years has been rapid and at the same time to a large extent typical of what has been done by many flourishing industries which have sprung up in the central West within a decade. The marvelous story of the gigantic strides made by some of the automobile manufacturers in a brief period is almost equalled by that of other plants engaged in the manufacture of automobile parts and accessories. The Globe Company, as a maker of automobile tool boxes, comes under this classification, being an example of what a comparatively small company has accomplished. This company was organized in 1901 and during the first six months of its existence did only $1,000 worth of business. Its sales during 1912 averaged nearly that amount a day.

Starting with a small amount of capital, additions to this at different times have made a total of only $20,000, and the earnings have been sufficient to enable the company to build a new plant, the value of which is estimated at ten times all the money outside of earnings that was placed in the business. The demand that the automobile industries has made on allied manufacturing interests is illustrated in the fact that about two-thirds of the output of this plant, employing 150 men, is automobile tool and battery boxes, of which it turned out about 100,000 last year.

The Buildings and the General Equipment

The new plant of this company as compared with its former quarters shows in a marked manner the recent improvements in factory construction and in arranging for the comforts of employees, as much attention being given to the latter as to providing a factory with such equipment and machinery and its arrangement as would insure the turning out of its product in large quantities at minimum cost. The company's former plant was in rented quarters in an old building and the lessons learned there led the company to go to the other extreme and provide the very best that could be had. To furnish good quarters for the workmen was regarded as one step in the line of efficiency and a matter of economy. The company in designing its plant went on the theory

View from West End of Main Building. Partly concealed behind the bridge are the windows adjoining the offices and affording a view of both floors of the shop

that not only could the best workmen be kept in a factory where there were pleasant surroundings and good light and various conveniences but also that men would do more work in pleasant quarters than they would in unpleasant ones. The company since its organization has been under the management of Albert S. Schroeder, secretary, treasurer and manager, who is the only salaried officer of the company.

The Globe Company's first product was sheet steel stampings made to order. To these were added tumbling barrels, then sherardizing and layer automobile tool and battery boxes. At present 65 per cent. of its output is in tool boxes, 25 per cent. in special metal stampings, including automobile parts, and about 5 per cent. each in tumbling barrels and Sherardizing equipment.

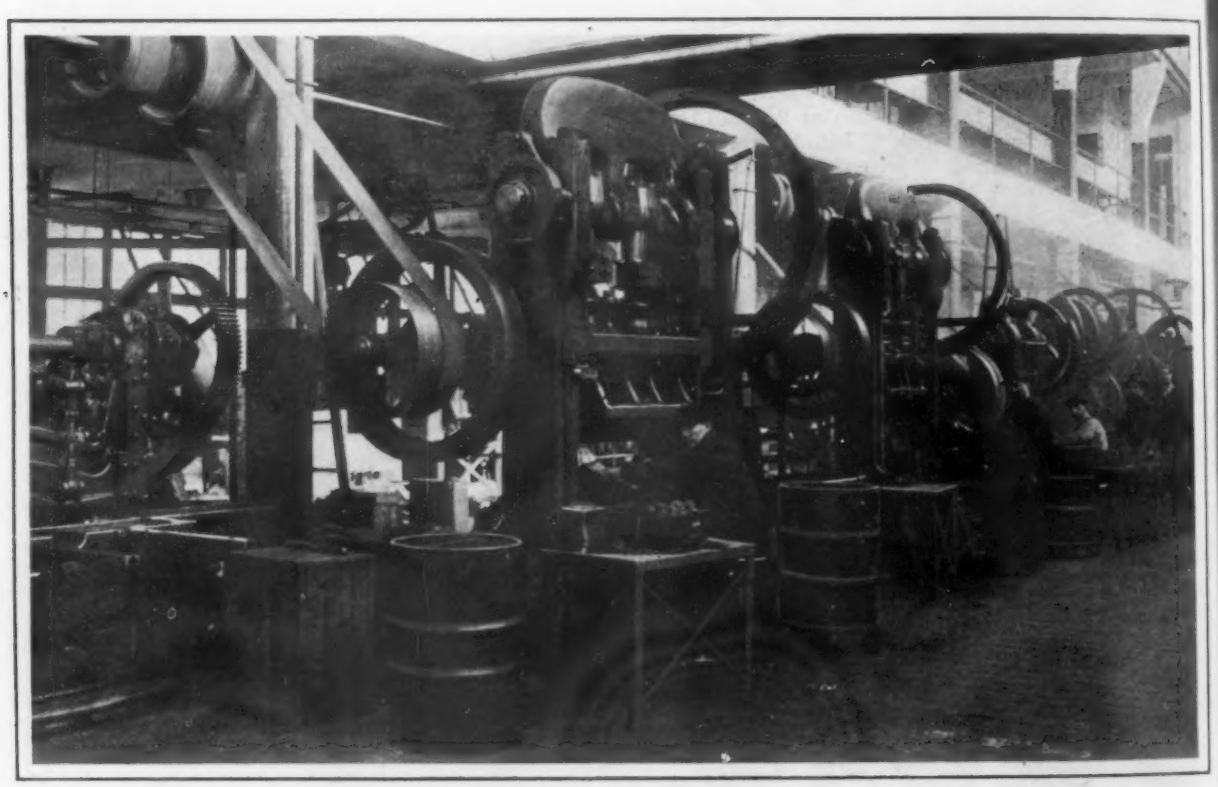
The company's new plant is located at 1250 West Seventy-sixth street, where it has recently acquired sufficient adjoining land to double its present size when further growth makes this necessary. The plant consists of a main building used for its stamping department and two other buildings, one a tool box factory and the other occupied by the japanning and Sherardizing departments.

The main building is a fireproof structure 107 x 219 ft. in size and two stories high, of reinforced concrete with brick walls and partitions. A space 26 ft. wide across the second floor front is used for office purposes. Through the greater part of the remainder of the building a light well 30 ft. wide extends, making the factory section of the second floor a gallery 37 ft. wide on each side. Above the light well is a monitor with steel trussed roof, the monitor being filled its entire length with Detroit-Fenestra steel window sash. The second floor and roof are supported by rows of 12 x 12-in. poured reinforced concrete columns placed along the edge of the gallery and spaced 20 ft. between centers. A projection extends from these columns at the top of the gallery to provide a runway for a crane should one be installed later.

The first floor ceiling is 14 ft. high and the second floor ceiling 15 ft. high. The second floor galleries are connected by a bridge near the center of the building and a 3-ton, 8 x 16-ft. Haughton electric elevator connects the two floors. An 18-ft. driveway extends through the center of the building. Wooden sash is used for the first and second floor windows. Factory ribbed glass is used throughout the plant where a diffused light is desired, but where fire protection is necessary wired glass is used. Concrete flooring is used on the first floor except the plating room, which has an acid-proof tile floor. The second floor is of 5-in. concrete covered with sand, and on this is laid 2-in. factory maple floor over 1½-in. pine. The roofs of all the buildings are concrete slabs covered with tar and gravel.

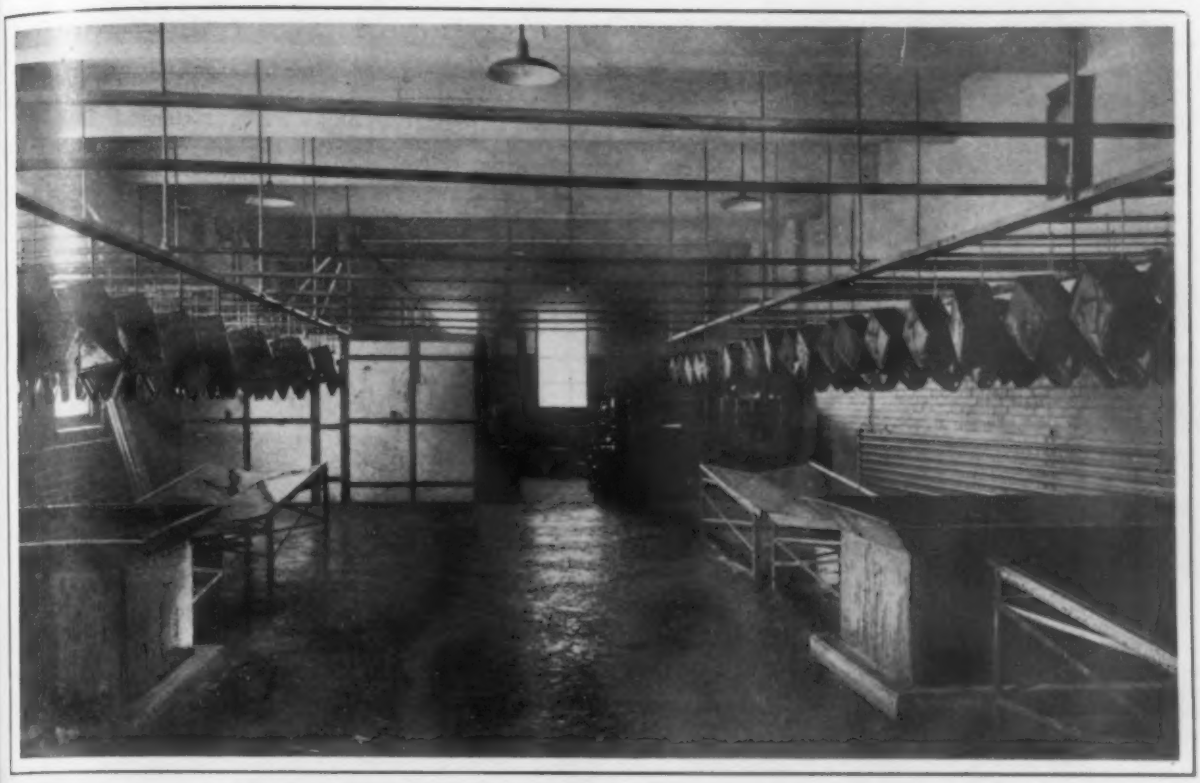
The office rooms are finely finished in oak and maple, the floors in the manager's and directors' rooms being polished oak. The directors' room is also used as a lunch room for the department heads. There is an inclosed corridor along the length of the offices and between the offices and the balcony, so that any office room can be reached through this corridor without passing through any other room. Windows open from this corridor to the plant and permit the superintendent or manager to step out into the corridor and get a view of the greater part of the first and second floors of the main building. The reception hall has marble wainscoting and this room and the corridor have Italian terrazzo floors. Indirect lighting is used in all the office rooms.

The first floor of the main building is used largely for the stamping department. In addition to that there is on that floor the plating, buffing and tumbling departments, the last for ball burnishing; raw material storage; 5000 sq. ft. of shelf space for die storage; sheet steel storage, about 400 tons usually being kept in stock; tool stock room, shipping department; tool room and lavatory. As electric power is secured from a commercial company the boiler room equipment is limited to a duplicate equipment of boilers for the gravity heating system and for electric transformers and other small equipment. The plant is heated by radiators, suspended from the ceilings. The heating plant is equipped with a Bishop-Babcock-Becker Company vacuum pump.



A Group of the Large Presses

On the second floor are die and tool-making departments, machine shop, sheet metal working department, assembling and storage space for large finished work, and a pattern shop. The press room equipment includes four shears, ten small presses and eight large presses capable of turning out all kinds of press work up to ⅜-in. stock. The largest press is a 210-ton hydraulic machine. The tool room for small tools is a cage inclosed space conveniently located between the machine shop and die-making departments. Shop economy is effected by having a hydraulic press in the machine shop for trying out dies before actually using them for production work. The machinery is group driven by 10, 20 and 40-hp. alternating-current motors. A uniform method of driving the main



Japanning Department, Showing Ovens in the Rear and Dipping Vats in the Foreground. Tool boxes are suspended from racks to drip

shaft from the motors is not employed, roller chains, linked belt and leather belts being used. Altogether 14 motors are used, the smallest being 1 hp.

Liberal bench space is provided along the walls and sides of the gallery on the second floor. These benches are unusually strong. The front part of the bench is of ⅞-in. tongued and grooved maple strips bolted together with an angle iron working edge and the back part is of 2-in. pine. The benches are 30 in. wide and have standard iron bench legs. Some of the benches are built in one section 200 ft. long.

Adjoining and connected to the rear section of the main building at the south side is the box factory, a one-story structure 165 x 97 ft. in plan. This building is of the monitor type and has brick walls and wooden columns. The monitor is 30 ft. wide. This building has a 23-ft. ceiling, this hight providing room for a balcony for light storage which covers about one-third of the floor space. About 2000 sq. ft. of this building is used for japanning in addition to the regular japanning department. There is a driveway at a slight incline from the street at the south side of the main building into the box department so that the loading platform at one end of this building is at a wagon box level.

In the manufacture of the Globe automobile boxes, the covers are made of one piece, being pressed to shape in the press department. The boxes proper are made in the box department, which is equipped with necessary presses,

Sherardizing Department, Showing Ovens to the Right

shears, drill presses, forming machines and brakes. The back seam of the body is electrically welded and the bottom is welded to lugs which are part of the body. The hinges and locks are also electrically welded to the back. For the work three Toledo electric spot welders are used.

The Japanning and Sherardizing Departments

Adjoining the box department on the south are the japanning and Sherardizing departments, which occupy a two-story reinforced concrete building 98 x 31 ft. in plan, with brick walls and generally similar to the main building in construction. An interesting feature of this building is that there is no direct connection between the japanning department on the second floor and the Sherardizing department on the first floor. The reason for this arrangement is that absolute cleanliness is necessary in the japanning department. The latter department is reached from a 20-ft. bridge from the balcony of the second floor of the box department, this bridge being conveniently reached by a special Otis elevator from the first floor.

In the japanning department is a 35 x 30-ft. room for cleaning and rubbing, which is separated by a fireproof cement partition from the japanning room proper, which occupies the remainder of the floor. The japanning room equipment includes two 20 x 12-ft. ovens and space is provided for an additional oven which is to be installed shortly. The ovens are of the Crawford sectional type, installed by the Oven Equipment & Mfg. Company, New Haven, Conn. In the cement floor there are two 3 x 5-ft. vats 6 ft. deep, with a capacity of 12 barrels each. The vats are deeper than are ordinarily provided for this purpose, made thus to keep a large amount of japanning liquid in the vats and allow dirt to set to the bottom.

In the Sherardizing department there are three fire brick, 20 x 6-ft. ovens, a machine oven, 8 ft. square, for small work, such as screws, nails, etc., which have to be continually agitated while being Sherardized and two concrete lead lined pickling vats, 3½ x 13 ft., for acid pickling. Industrial car tracks run into the larger ovens. After parts are Sherardized, the cars containing them are taken from the ovens by means of a 10-ton crane. The ovens in both the japanning and Sherardizing departments are fired by natural gas.

For lighting tungsten lamps are used throughout the plant except in the press department, where Cooper-Hewitt lamps are used. Most of the tungsten lamps are of 250 watts capacity. Some of these are hung singly and others in clusters. Suspended from the monitor of the main building are eight clusters each having four 250-watt lamps. Apolite reflectors are used in connection with practically all the tungsten lamps. All wires are placed in conduits.

The plant is well equipped with toilet conveniences in the various departments, and with ventilated metal lockers and bubbling drinking fountains. Hot and cold water is provided in the lavatories and there are shower baths in the box department lavatory. The factory furniture, including racks, stools and tables, is practically all of steel. As an added precaution against fire all openings through fire walls are protected by automatic fire doors. The installation of an auto-call system facilitates communication from the office to any part of the plant.

The Best Mfg. Company, Pittsburgh, gives some particulars of the contract received for piping equipment for the new plant of the New York Edison Company, New York City, covering an installation of 32 Babcock & Wilcox boilers and three 19,000-kva. turbo-generators, and all necessary auxiliary equipment, with reservations for five additional turbines and 32 boilers. All steam fittings and valves will be made of cast steel of a special extra heavy pattern, and all piping will be fitted with reinforced Vanstone flanges made of cast steel, suitable for 200 lb. steam working pressure and 150 deg. superheat. The plant has been designed for the most convenient operation, the valves being equipped with extension stems and gearing for operation from the floors. An important feature will be the building of a complete duplicate of the plant in miniature for testing purposes. The entire installation is expected to be completed and in operation by October.

A Natural Draft Cooling Tower

Recent Installation at West Pullman Plant of the International Harvester Company

For use in low-pressure steam turbine plants, where the condensing water required for successful operation is scarce, the Wheeler Condenser & Engineering Company, Carteret, N. J., has developed a type of natural draft cooling tower. This tower, which is known as the Wheeler-Balcke tower, operates on what is known as the drop and film principle, which is applied by arranging the cooling stacks in zigzag tiers. While retarding the downward flow of the water these are found to present little resistance to the upward flow of the air. The function of the laths employed is to retard the downward flow of the water and spread it out into thin films, collect it and break it up into drops, so that a large and constantly changing water cooling surface is presented to the air. Fig. 1 is a sectional elevation of a typical tower, showing the arrangement of the various parts, and Fig. 2 shows the exterior of one of these towers installed at the plant of the International Harvester Company, West Pullman, Ill.

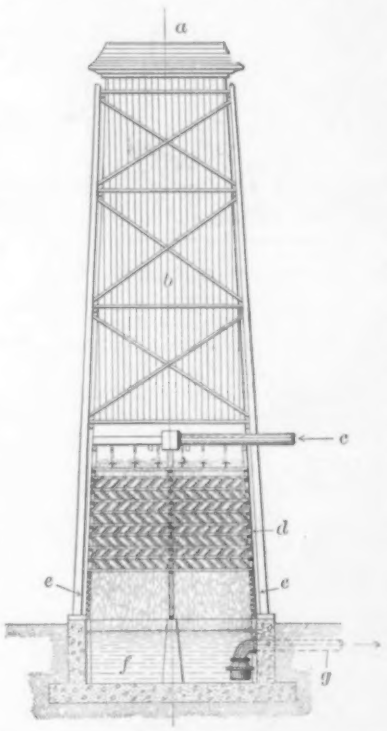


Fig. 1—Sectional Elevation of a Typical Wheeler-Balcke Natural Draft Chimney Type Cooling Tower

The vapor outlet *a*, Fig. 1, is located at the top and below that is the chimney *b*. At the bottom of the chimney is the water distributing system which receives the water to be cooled from the inlet pipe *c* and discharges it evenly over the whole surface of the tower. The cooling stack *d* and the air inlets *e* are located below the water distributing system, and at the lowest point is the cold water well *f* in which the water is collected and from which it is drawn to the condenser through the suction pipe *g*. A framework of yellow pine, resting directly upon the foundation, supports the chimney and the vapor outlet, which are of cypress boards. The hight of the chimney, it is emphasized, is sufficient to prevent a loss of water by the formation of spray and to draw a strong natural draft and a vigorous flow of air through the cooling stacks. The frame is constructed with mortised and tenoned joints where necessary and is bolted together with steel bolts with large iron washers on each side to withstand the pressure of a 50-mile wind. The shell of the chimney and the tower consists of surface tongued and grooved 1-in. cypress boards and both the shell and framework are treated after erection to prevent deterioration.

The main trough into which the water is discharged from the water inlet *c* is of 1½-in., cypress planks, and from this water flows into lateral gutters that in turn distribute it over the entire area of tower by iron pipes spaced at equal intervals. From these pipes the water falls upon galvanized steel splash plates which break the water into a fine spray, thus presenting a cooling surface of maximum area to the rising air current. The water then impinges upon the triangular cooling laths *d* below, which are arranged in zigzag tiers, as shown. In this way the water is continually broken up, turned over, spread out in a thin film and retarded in its downward progress to expose a large amount of surface to the rising current of

air. The laths are supported by a framework of cypress which is independent of both the tower and the chimney. The air enters the tower near its base at the point *e*, louvre boards being used to prevent the loss of water by splashing and diverting it into the cold water well *f* which also forms the foundation for the tower. A working platform with a handrail is built on one side of the tower, which is reached by a ladder. A door which forms part of the shell gives access to the interior of the tower, and the distributer may be cleaned out by a broom while the tower is in service.

The tower shown in Fig. 2 has a cooling capacity of 72,000 gal. per hour. It is erected over a concrete reservoir, 75 ft. in diameter and having a capacity of 600,000 gal., which is regarded large enough for a second tower of equal size. The reservoir forms a large cold well which also acts as a reserve source of water supply for the fire pumps. This tower operates in connection with two jet condensers, the tail pumps discharging directly to the distributer of the cooling tower through the pipe which can be plainly seen. The low elevation of the distributers, which is a feature of the tower, can be estimated from the hight of this pipe. The base of the tower is slightly above the level of the turbine room floor and is at a considerably higher elevation than the condensers which are in the basement underneath the turbine. In case of the vacuum failing siphons in the suction lines prevent the flooding of the condenser.

A series of tests made recently on this tower showed that the air left the structure fully saturated with moisture. This condition is of course desirable, as it means that the minimum amount of air is used and a reduction in the volume of air employed lessens the friction in the passages. In two tests the percentage of moisture in the entering air was 84 and the temperature was 63 deg. F. In one case, the water was cooled from 99 to 82 deg. and in the other from 106 to 82 deg. When these tests were made there was no breeze and the sky was cloudy. About two weeks after these tests were made, on a moderately warm but dry afternoon with the atmospheric conditions slightly more favorable, the tower was supplying ejection water at a temperature of approximately 72 deg.

Lake Superior Iron Ore Shipments in 1912

The statistics of all-rail shipments of Lake Superior iron ore in 1912 have been collected by the Iron Trade Review. The total is 776,001 gross tons. This amount, added to the shipments by lake, as given in these columns after the 1912 season of navigation closed, makes the output of Lake Superior mines which was shipped last year, 48,211,778 tons. This compares with 32,793,130 tons in 1911 and 43,442,397 tons in 1910, which was the previous record year. The shipments by ranges for three years were as follows in gross tons:

	1912.	1911.	1910.
Marquette	4,202,308	2,833,116	4,392,725
Menominee	4,711,440	3,911,174	4,237,738
Gogebic	4,996,498	2,603,318	4,315,314
Vermillion	1,844,981	1,088,930	1,203,177
Mesaba	32,047,409	22,093,532	29,201,760
Cuyuna	305,111	147,431	.....
Miscellaneous	104,031	115,629	91,682
Total	48,211,778	32,793,130	43,442,397

It appears that the Steel Corporation's share of the total in 1912 was a little less than one-half—49.46 per cent. In only one previous year, 1910, did the shipments of independents exceed those of the corporation. In that year the percentage of the Steel Corporation was 50.14. It shipped 51.36 per cent. in 1909, 56 per cent. in 1907 and 1908 and 53 per cent. in 1906. The Steel Corporation at the close of 1912 was about 900,000 tons short of meeting the minimum requirements of the Hill lease. For 1913 the minimum is 5,250,000, and for 1914 6,000,000 tons.

The Mesaba range percentage of the total shipments last year was 66.47 against 67.37 in 1911. The Gogebic range showed a rather remarkable increase with a total of 4,996,498 tons, or 681,184 tons more than in 1910, its best previous year. Its percentage of the total was 10.36 against 7.94 in 1911. The total number of Lake Superior mines producing last year was 194, against 184 in 1911, 196 in 1910 and 172 in 1909.

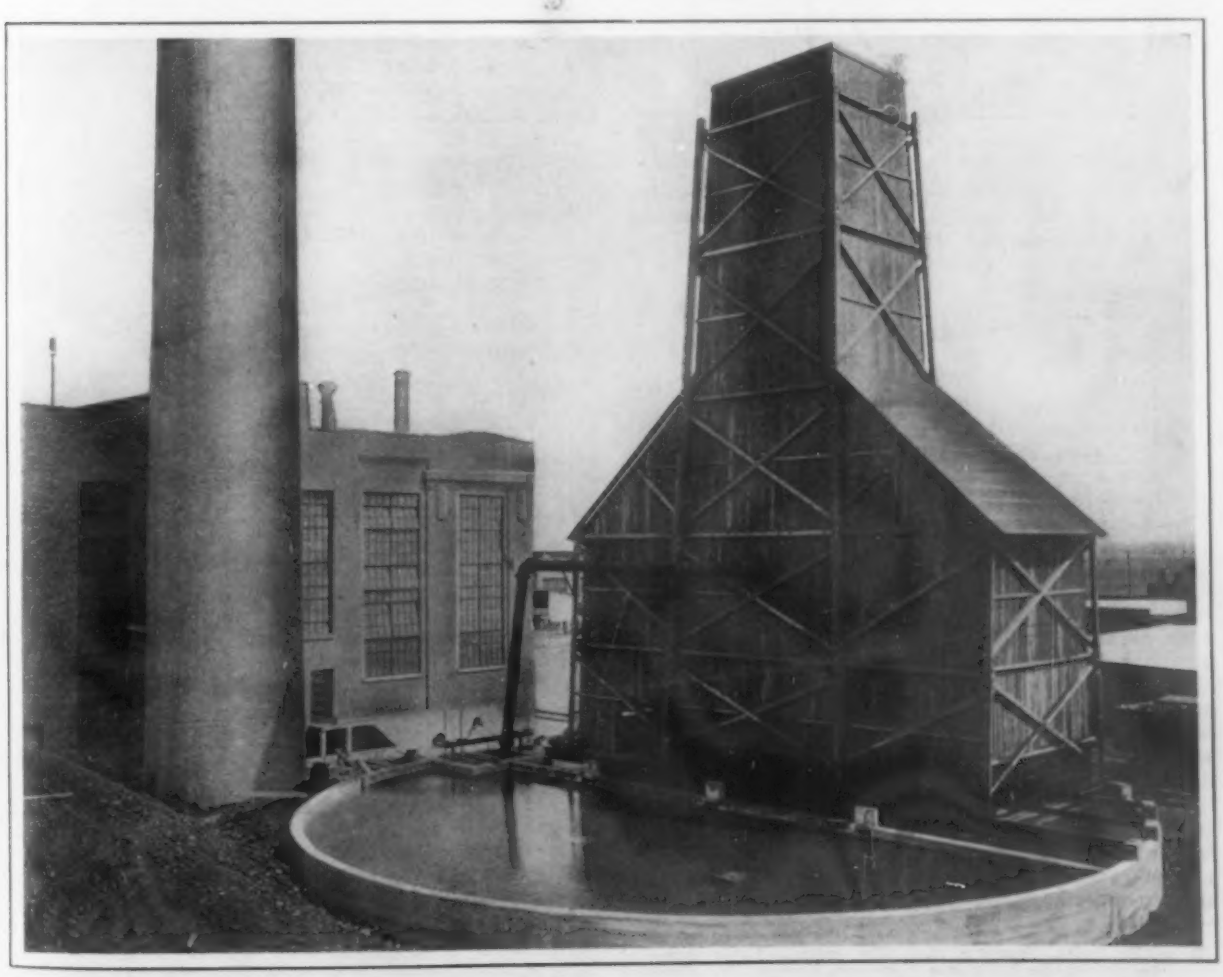


Fig. 2—One of These Towers Installed at the Plano Plant of the International Harvester Company, West Pullman, Ill.

New Open-Hearth Furnace Designs*

Arrangement of Ports of the Steel Furnace Using Producer Gas

BY HERBERT F. MILLER, JR.

For a long time I have believed that the gas- and brick-costs of open-hearth furnaces using producer gas could be greatly decreased by a change in the design of the port, which would materially reduce the first cost of the furnace, the rebuilding cost and the repair cost. The defects of the present type of such furnaces, which has done duty for so many years, may be studied in Fig. 1, in which *AA* are the two air-uptakes, *B* is the gas uptake and *C* the end of the gas-port.

In the present type of furnace, *C* is practically on the edge of the bath and therefore combustion begins to take place at that point, but has no effect until the gas passes 5 to 10 ft. into the hearth. As the furnace grows older, *C* moves back by reason of the burning or falling down of the arch. The furnace reaches its highest efficiency when *C* has moved a certain distance, but is still near enough to the bath for the overhead layer of air to hold the gas down on the bath, and far enough back to permit combustion to take place at some distance from the bath. This latter fact means that the temperature is sufficient to melt steel at the edge of the port. From this time on, the furnace decreases in efficiency. What is the reason?

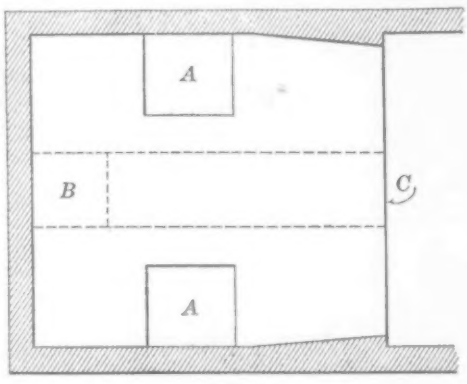


Fig. 1

As *C* moves further back, the gas is relased from the gas port at a point where there is little or no overhead layer of air. The result is that the gas floats along the roof, with the air mostly underneath it. Why the air does not stay over the gas is readily seen in Fig. 1. The lines of draft naturally run parallel to the length of the furnace. The air-uptakes being on the sides and the gas-port in the middle, most of the air will naturally be drawn along the sides of the furnace and the layer of air will be thinnest over the gas where it is most needed. Thus, as *C* moves back the overhead layer of air becomes thinner until *C* has reached a point where it is in line with uptakes *AA*, and where there is no overhead layer of air. The gas then goes to the roof. The life of this type of furnace is 180 to 250 heats.

The foregoing history of the run of producer-gas furnaces, showing the causes of loss of control of the gas and its results in poor combustion, with consequent comparatively short run, suggests the question, Can a furnace be designed for producer-gas which will have a good gas control and a good combustion to the end of a run of, say, from 400 to 700 heats?

This end can be attained by either of two designs, both of which involve the same principle of putting a single air-uptake directly back of the gas uptake as is shown in Figs. 2, 3, 4 and 5. In Figs. 2 and 3 the port has about one-third of the width of the hearth, whereas the present type has the full width. The roof of the port dips sharply, compressing the air down on the gas; and the roof of the hearth is gradually dropped to meet it. The gas-port arch is retained, although flattened to the width of the port. The end *C* is 6 to 10 ft. from the edge of the bath. There is a small seal door on each side of the port at *C* to permit the repair of the port or the removal of the brick which might fall from the gas-port arch. The point *C* will move back slower than in the present type, because it will be less exposed to the flame, which will always be under the air.

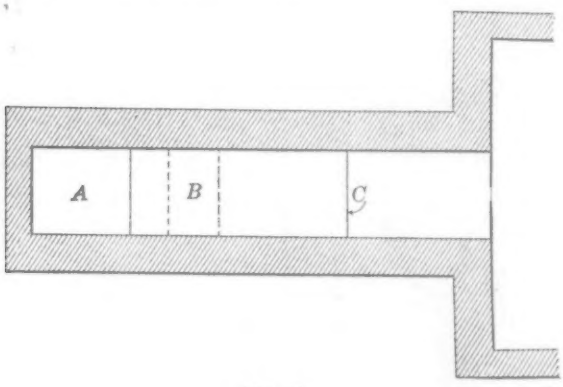


Fig. 2

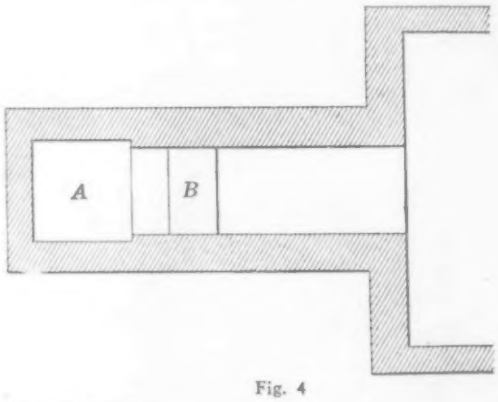


Fig. 4

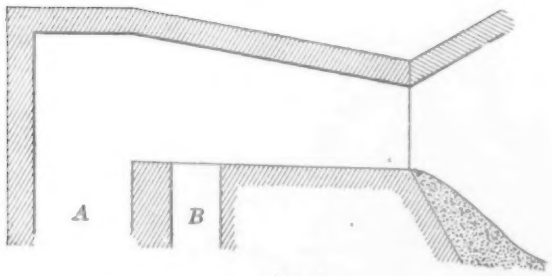


Fig. 3

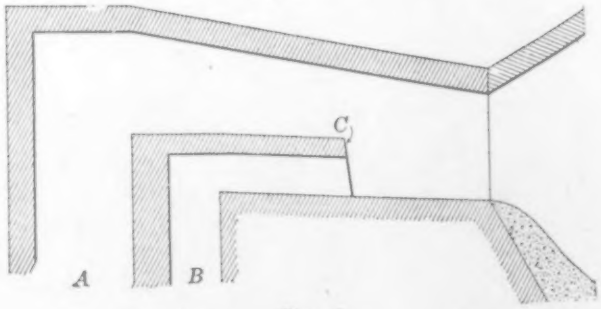


Fig. 5

ARRANGEMENT OF PORTS FOR OPEN-HEARTH FURNACES USING PRODUCER GAS

The possible defect of this design is that when the gas-port arch has become short, combustion will commence too far from the bath, and make a high gas cost. Another objection is that this design could not be applied to existing furnaces because their ports would have to be lengthened considerably. If the flame in the above design can always be controlled, even when the gas post arch has burned back to the gas uptake, why have a gas-port arch at all?

The design shown in Figs. 4 and 5 is the solution. Here it will be seen that the furnace is similar in outline to the present open-port type in use at Homestead. The air uptake *A* is back of the gas-uptake, from which it is separated by a substantial wall. The gas uptake, which is as wide as the port, is 6 to 10 ft. from the bath. The port is open and smooth, narrow and low. The small cross-

*Paper substantially in full read before the American Institute of Mining Engineers, February 19. The author, who is connected with the Verona Steel Castings Company, Verona, Pa., discussed open-hearth furnace design at length in *The Iron Age* of June 27, 1912.

section of this port assures a speedy union of the preheated air and gas, resulting in a short flame of intense heat, which will be under control throughout the run.

Some may think that the gas rising at right angles to the air will make a high flame. If the port is low enough this will not occur. I have put a stream of air having a pressure of 70 lb. per square inch under a natural-gas flame and found that there was very little deflection of the flame.

This design could be applied to the present type of producer-gas furnaces. The only alteration of importance would be a reversal of the gas checkers from the outside to the inside position.

In building a new furnace a great saving in brick would be made in the ports, as can be readily seen. Repairs to the dividing wall can be made through small seals by the side of the gas-port. The flame will always be under control and the furnace should slow up only because of dirty checkers and insufficient draft. Natural gas could be used if desired by introducing it as usual at the sides and in front of the uptake *G*.

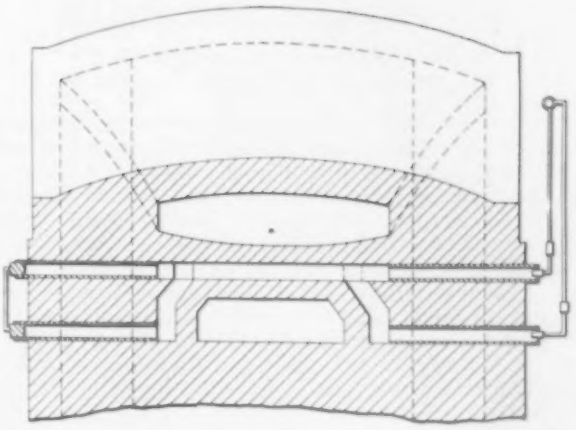
Cooling Device for Open-Hearth Steel Furnaces

Patents have been issued to Henry Knoth, Monterey, Mexico, covering a device for cooling the ports of an open-hearth steel furnace or other furnaces which are subjected to destruction by the intense heat. The special feature of the device is the use and arrangement of air passages or channels, running either directly or indirectly through the affected portions of the furnace.

While it is emphasized that these channels will effectively cool the port arches of the furnaces without the aid of any additional agent, at the same time where a very rapid cooling is desired, means for creating an artificial draft through the channels are employed. This consists of one or more blowers which are connected directly to the openings of the channels. Steam or any other available means may be employed for driving these blowers, and it is emphasized that in this way there are no pipes or other wasteful material required. The arrangement of these channels is brought out in the accompanying engravings and drawings.

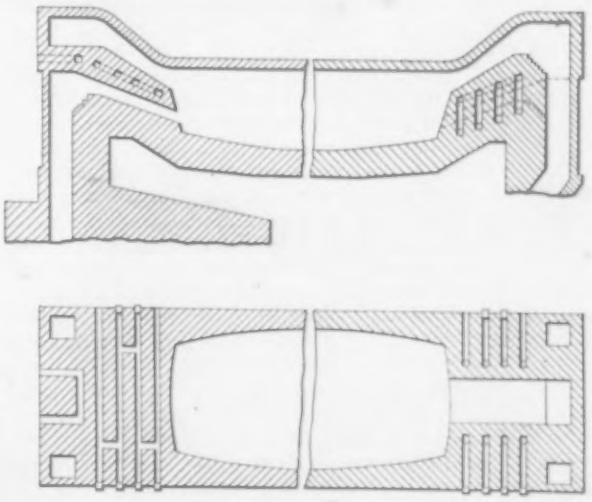
The channels are simply passages left in the brickwork while the furnace is being built. If these channels run straight through the brickwork, they will convey the cooling air directly upon the bricks and the joints which need it, as well as giving the furnaceman a chance to observe the effectiveness of the cooling from the furnace floor. In this way, it is possible to regulate the supply of cooling air and give better control of the cooling action by increasing or decreasing the strength of the draft according to the need of the furnace. If, however, it should be desired to have circuitous passages established through different parts of the furnace, it is possible to have other vertical or transverse passages that connect the main ones and which can be operated simultaneously by only one blower. When this is to be done stoppers can be applied to the outlets of the channels from which the draft is to be diverted, thus leaving only one outlet open for the entire circuitous passage.

Exterior View of a Furnace Equipped with a New Cooling Device Invented by Henry Knoth, Monterey, Mexico



Transverse Section Showing the Steam Injector Used

A cooling device of this kind but with three straight passages has been in operation for some time at the plant of the Monterey Iron & Steel Mfg. Company at Monterey, and it is stated that the records of the plant show that the output of the furnace has been more than doubled since the system was applied. The channels in this plant are cooled by steam blown through several ⅛-in. nozzles and there are a number of pipes at the entrance of the channels, so that all of the water of condensation can run out. The arrangement of the device in this plant is shown in the halftone and also in the transverse section of the furnace.



Sectional Elevation and Plan View Showing the Arrangement of the Passages for the Cooling Air

Conference on the Development of Uses for Electricity—The Society for Electrical Development, Inc., which was organized to bring about a more general use of electricity in all its forms, held a conference on March 4 and 5, at the Engineering Societies Building, 29 West Thirty-ninth street, New York City. The object of this society, which is clearly indicated by its name, is the bringing about of a more general use of electricity in all fields. A number of papers dealing with the various phases of electricity and its uses and how they might be increased were presented. One of the lines along which work is to be done is the increasing of the uses of electricity on the farm as a substitute for manual labor. In connection with the development work, the society plans to inaugurate a widespread publicity campaign, looking toward the education of the general public.

Early Increase in Steel Capacity

Easier Conditions Expected in the Next Few Months in Central Western Districts

Barring unusual delays in construction work, there will be a very material increase in output of open-hearth steel in the Pittsburgh and other Central West districts within the next three or four months, and the acute shortage in supply that has existed for months will be relieved. Five large open-hearth steel plants are under construction, and several companies are adding one or more furnaces. The largest plant under way is that of the Carnegie Steel Company at Bessemer, where the Edgar Thomson blast furnaces and Bessemer steel mills are located. Work on it was started in June, 1912, and it will embrace 14 60-ton open-hearth furnaces with a monthly capacity of about 60,000 tons of ingots. A new rail mill is also to be built at Bessemer for rolling standard sections, supplanting the present No. 1 mill, which is to be torn out later. The present blooming mill will be supplemented by two stands of rolls of four passes. Steel will be made in some of these new furnaces in the early summer, but it will be later in the year before all are completed. This new steel capacity will allow the rolling of open-hearth rails at Bessemer, which has been done heretofore at the Ohio Works at Youngstown, and will enable the latter works to run continuously on sheet bars for the sheet and tin plate trades.

The next largest new open-hearth plant is that of the Pittsburgh Crucible Steel Company at Midland, Pa., which will contain eight 75-ton open-hearth furnaces with a monthly capacity of 40,000 tons of ingots. The Pittsburgh Crucible Steel Company is an identified interest of the Crucible Steel Company of America, and the latter is a heavy buyer of billets in the open market for its mills in the Pittsburgh district. When the open-hearth plant at Midland is completed, which will be about the middle of the year, the company will be in position to supply steel for its new finishing mills under way at Midland and its present mills in Pittsburgh. At Youngstown, Ohio, the Youngstown Sheet & Tube Company has well under way an open-hearth plant to contain six 75-ton furnaces and a 42-in. blooming mill, the works to have a monthly capacity of about 30,000 tons. Much of this steel will be used in the present finishing mills of the company in East Youngstown, but at the start part of the product will be sold in the market in the forms of billets and sheet bars. This plant is expected to be completed in the early summer. Also at Youngstown the Brier Hill Steel Company is building seven 75-ton open-hearth furnaces which will be ready in the late summer and provision is being made for adding seven more later. This plant will have an estimated monthly capacity of 35,000 tons and a good part of the output will be sold in the open market. The Brier Hill Steel Company is a heavy producer of sheets and other specialties, and is a heavy buyer of steel in the open market, largely from Youngstown mills. The Republic Iron & Steel Company is also adding two 60-ton open-hearth furnaces at Youngstown, to be completed about August; the La Belle Iron Works is adding a 50-ton furnace to its open-hearth plant at Steubenville, Ohio, and at several other plants in the Central West open-hearth capacity is being increased by the building of one or more new furnaces, or the rebuilding of present ones. The new capacity in open-hearth steel per month that will probably be ready by next October in the Pittsburgh and nearby districts is as follows:

Carnegie Steel Company	60,000 tons
Pittsburgh Crucible Steel Company	40,000 tons
Brier Hill Steel Company	35,000 tons
Youngstown Sheet & Tube Company	30,000 tons
Republic Iron & Steel Company	4,000 tons
La Belle Iron Works	3,000 tons
Total	172,000 tons

In round figures, the Central West will have its steel capacity increased late this year by 175,000 tons a month, or 2,100,000 tons a year over 1912. The consumption of steel is growing at an enormous rate, but this large increase in capacity will probably largely meet the shortage in supply that has existed for some months, and which has compelled consumers to pay $30 and even $31 for sheet bars to tide them over periods when regular sources of supply were not furnishing steel fast enough to meet their needs. In addition to the above new steel capacity that is absolutely assured, two new plants are practically decided upon for the Cleveland district, work on which is expected to start soon, also a small open-hearth plant at Canal Dover to use direct metal and to be built in connection with a new sheet mill. One of the largest sheet and tin plate concerns in the Pittsburgh district has plans made for an open-hearth plant to make 700 to 1000 tons daily, and recent advices are that it may start active work in the near future.

In view of the above figures for plant under construction the statement seems to be fully warranted that by July or not later than October next there will be ample steel capacity to meet the demands of the finishing mills that draw their supply from the steel works in the Pittsburgh and other Central West districts.

Railway Steel Spring Company's Year

The Railway Steel Spring Company's annual report, setting forth the results of the year ended December 31, 1912, presents the following income account in comparison with the preceding two years:

	1912	1911	1910
Gross earnings	$9,041,079	$6,160,496	$10,035,435
Less manufacturing and administrative expenses	6,599,940	4,793,481	7,734,535
Depreciation	359,986	150,000	350,000
Net earnings	$2,081,153	$1,217,015	$1,950,900
Interest	357,175	232,228	195,823
Preferred dividends	945,000	845,000	945,000
Surplus for year	$778,978	$39,787	$810,077
Total surplus Dec. 31	$4,618,543	$3,839,565	$3,799,778

From President F. F. Fitzpatrick's accompanying remarks the following extracts are taken:

The general balance sheet shows an increase in the quick assests. The demands upon the company's resources due to the increase of business has resulted in an increase of merchandise on hand and a marked increase in accounts due from customers, while cash on hand shows a decrease of $259,183 as compared with the preceding year. The quick assets are $5,883,093 and the current liabilities $600,746, leaving an excess of quick or liquid assets of $5,282,346, compared with $4,265,726 last year.

In the last annual report reference was made to the purchase of a plant at Chicago Heights, Ill., for the manufacture of steel tires and allied products. This plant has been operated very efficiently during the year 1912, and the expectations of the management as to the advantages to be derived from the ownership of this property have been more than fulfilled.

During the past year workmen's compensation laws have been passed in some of the States in which the company's plants are located. Heretofore the company has been insured against the liability of accidents to employees in these States, but owing to the marked increase in the rates of liability insurance the management has deemed it wise to rely upon its past experience at certain plants and accept the responsibility of accidents to employees without the protection of a liability insurance policy. A reserve fund has been established, which it is expected will be sufficient to meet the liability cost of operation under the new laws. The relations of the company with its employees have in no way been affected by these changed conditions.

The plants of the company have been maintained in the best physical condition, and larger amounts than usual have been expended in their up-keep and charged to expense of operation.

During the closing months of the year business showed an improvement, and it is hoped the present satisfactory conditions will continue well into the future.

A report just issued by the Union of German Machine Tool Manufacturers states that in view of the increasing productive capacity of German machine-tool makers, larger foreign outlets are considered absolutely necessary, and every endeavor is to be made to induce the government to frame the new commercial treaties on lines which will assist the machine-tool industry in its attempts to extend its hold on the export trade. The total number of workpeople employed in the manufacture of machine tools in Germany is over 80,000, with over 7000 officials in addition, while the total annual output is given as 225,000 tons, valued at $53,550,000.

The Newark Foundrymen's Association

The Newark Foundrymen's Association, Newark, N. J., at its monthly meeting held March 5, was addressed by William C. Wright, of the National Founders' Association, on the use of molding machines and the preparation of patterns for machine molding. At the conclusion of the address not nearly so many questions were asked of the speaker as he desired, the reason being that many of those present used the machines which had been referred to and were in accord with the rules of operation which he had laid down. A few small castings were submitted to him for his judgment as to the best method of production and he at once said they could best be made on stripping plate machines. Mr. Wright pointed out that inasmuch as the shortage of skilled labor is steadily becoming acute, recourse to molding machines grows more and more necessary, while another incentive in their adoption is their practicability on a wide range of work. The fact was not to be overlooked, he remarked, that the molding machine does not deserve all the credit for its good and prolific output, as a great deal depends on absolutely correct patterns and rigging. If a pattern is not just right, it should not be tinkered with in the foundry but at once sent back to the pattern maker. A vote of thanks was given Mr. Wright.

At a business meeting which followed the address, the association placed itself on record as opposed to a bill which had been passed by the New Jersey Assembly and was awaiting action by the State Senate, the intent of which is to prohibit the employment of women as coremakers. Few, if any, of the members of the association employ women coremakers, but all of them considered the law unjust because of its sweeping provisions. It was the sense of the association that women should not be employed to do heavy work and that their surroundings should be clean and light and in every way sanitary; that their workroom should be separate from that of the men, and that proper partitions should protect them from any smoke or gases which might come from core ovens. The members were emphatic, however, in their delcaration that women and girls of proper age should not be debarred from the almost dainty work of making the light cores for which they have shown such aptitude. It was voted that a committee go to Trenton and oppose the objectionable bill but at the same time to recommend a modified law which would be fair to all.

Another bill, also before the Legislature, which would make it illegal for any person to restrict the opportunity for a youth to learn a trade if he so desired, was voted a proper measure and the committee instructed to urge its passage. Eight members volunteered to serve on the committee and go to Trenton March 10.

The Philadelphia Foundrymen's Association

The subject of "Sand Blast Equipment," presented by A. G. Warren, mechanical engineer, and I. F. Kremer, of the J. W. Paxson Company, Philadelphia, brought out a large attendance of local and out of the city foundrymen at the regular meeting of the Philadelphia Foundrymen's Association, held at the Hotel Walton, on the evening of March 5. Mr. Warren opened with a brief historical sketch, followed by a description of various types of equipment and installations of apparatus for sand blasting iron, steel and brass castings, the removal of paint, the cleaning of stonework, etc., all illustrated by lantern slides. He outlined the economy of a sand blast plant used in the cleaning of castings, as not only reducing the expense for cleaning labor but also effecting a material saving in machinery cost, owing to the more effective removal of particles from the surface of the castings.

At the business meeting of the association, held prior to Mr. Warren's address, M. L. Kirn & Brother, brass founders, Philadelphia, were elected members of the association. The treasurer reported a substantial cash balance, with no unpaid bills outstanding.

Following the meeting luncheon was served, after which Howard Evans, acting as toastmaster, called upon John Alexander, Thomas M. Eynon and J. Howard Sheeler, who responded with brief addresses.

The American Steel Foundries' Year

The annual report of the American Steel Foundries, covering operations in the fiscal year ended December 31, 1912, shows that a net profit of $777,556.17 was realized. The previous period for which a report was rendered was the 17 months ended December 31, 1911, as at that time the company's fiscal year was being changed to the calender year. Business was so depressed at that time that a deficit of $259,030.92 was shown. The income account for these two periods compares as follows:

	Year ended Dec. 31, 1912.	For 17 mo. ended Dec. 31, 1911.
Earnings from operations of plants and net income of subsidiary companies (after deducting manufacturing, selling, administrative and office expenses and before deducting depreciation)	$1,543,838.89	$697,610.53
Other income	44,927.25	59,492.75
Total income	$1,588,766.14	$757,103.28
Deduct:		
Interest on borrowed money	3,245.83	2,587.50
Interest on debentures	137,472.00	194,752.00
Interest on bonds:		
Outstanding	163,611.33	329,091.66
In sinking fund	68,919.51	
Bond sinking fund instalment and profits	115,254.40	157,066.84
Depreciation of all properties	322,506.90	332,636.20
Balance—Net profit	$777,756.17	*$259,030.92

*Net loss.

The balance sheet as of December 31, 1912, shows quick assets of $5,827,536.04, including $229,438.12 in cash, as against which is to be charged $1,182,047.05 for accounts payable. The profit and loss surplus December 31, 1912, was $553,237.46.

From President R. P. Lamont's accompanying statement the following extracts are taken:

The gross sales for the year were $14,319,571.58 and the gross earnings from operations of plants and other income after deducting manufacturing expenses (which includes $1,160,536.32 for repairs and maintenance) also all selling, administration, head and district office and other expenses were $1,588,766.14. The net income of $777,756.17 applicable to surplus is the remainder after deducting all interest and $322,506.90 for depreciation of fixed properties, also $184,173.91 appropriated for the sinking fund of the company's first mortgage bonds as required by the terms of the indenture securing them.

In comparing the earnings for 1912 with the preceding fiscal period, which showed a loss of $259,030.92, it should be borne in mind that such period covered a term of 17 months, only the first few of which showed any profit. If the results for 1912 be compared with the calendar year 1911, the change is far more pronounced, as that 12 months' operations showed a loss of $514,801.82. Gratifying as the year's showing may be, especially in comparison with the preceding year, it should be remembered in considering any disposition of the surplus that the company is under obligation to retire and cancel during the current calendar year at least $343,680 of its 4 per cent. debentures. From the bond sinking fund $441,400 par value of the first mortgage bonds was bought and retired during the year and the balance of the fund, together with accretions to December 31, will purchase at least $30,000 more, making the total retired or provided for to December 31 $1,525,000 out of the total issue of $3,900,000.

At East St. Louis equipment for the production of car couplers has been installed as a matter of freight saving and consequent profit. At the Hammond plant a new building for the production of brake beams has been added to take care of the increased demand for that product. The fire-protection system mentioned in the last annual report has been completed and the company is receiving the full benefit from it, both in reduced insurance cost, as well as added security.

In conclusion it may be said the pronounced business depression of 1911 continued well into the following year, but about midsummer noticeable improvement in the volume of orders became apparent. The improvement, however, was not reflected in the company's earnings until two or three months later; hence the year's showing is largely the result of the operations for the last six months of the period. At the present time the volume of orders in hand is with one exception the largest in the history of the company.

The Definition of a Machine Tool

A Variety of Restrictions Discussed but the Cutting of Metals and Use in a Machine Shop Are Chief Requisites

BY R. I. CLEGG

What is a machine tool? To some people it is only one that works metals. Others hold that a woodworking machine may be a machine tool. Yet other mechanics restrict their use of the term to metal-cutting machines, and therefore they would exclude metal-bending or metal-forming and perhaps metal-punching or shearing machinery. The question of power also arises, and it may be that a foot-power machine would not be a machine tool to every one.

It is clear that from several points of view we can find plenty of scope for differences of opinion, and the first task ahead is to try for grounds of agreement. If we can cast aside the more disputable points we shall afterward go forward more surely.

We may take up the subject in the light of the material upon which the machine operates, the construction of the machine, its use, the manner of its driving, etc. Size and complexity of the machine have to many an important bearing on the question. Of course, these are items which may be considered under the head of construction.

Definition by Exclusion

Every one of us is familiar with a lathe tool. We can take such a chunk of tool steel, clamp it in a tool post, and provide it with screws for hand adjustment and for power translation by means of a supporting carriage moving along suitable guides or ways. This would not appeal to a mechanic as being a machine tool. In fact, it is practically nothing more than such a supplementary attachment as a compound rest is, for example. If we attach that sort of a device to a frame or bed supporting the work and also provide a means for applying the tool to the work and for causing the one to properly operate by power upon the other, as in a lathe, then we have what would doubtless be recognized as a machine tool. We have as that machine tool a mechanical means for guiding a metal-cutting tool, for rotating the work upon the centers and in contact with the tool, and power applied to these co-ordinate elements. Are these sufficient for us to use in all cases to determine whether or no a certain mechanical contrivance is a machine tool?

The Anvil Principle

Nothing has thus far been said of the anvil principle in machine design, and yet this will probably be held as a feature of prime consequence in a machine tool. Let us take up in this connection the question of the material that is to be worked in the machine. During the past quarter of a century metal-cutting machines have acquired a sturdy solidity of shape. They are strongly resistant of the forces tending in the direction of distortion. This anvil principle is altogether foreign to the light architectural frames which were formerly only intended to connect stoutly the working members and were not designed to brace them firmly into one substantially welded and well-ballasted co-operation of correlated elements.

Because of this strength of the elements so united and their massive appearance, these machine tools have served structurally as models for other machines, and these in turn, because of their being built on machine-tool lines have been called machine tools, though not intended for use in machine shops. This resemblance does not necessarily make them machine tools any more than the use of an engine lathe for an occasional job of wood-turning makes it a woodworking machine. The use of the term "machine tool" for some woodworking machines is often noted and the title may in time come universally to mean machines of a certain type of general design and to have no special relation to the material they work or to how it is cut or shaped in the sequence of operations performed on the machine.

The matter of size is also quite important. A boring mill or a radial drill comes in the class of machine tools. All the press drills may by courtesy be put into the same class, though there come to the mind recollections of a few "left-overs" that should long ago have gone to the scrap pile.

A breast drill is not so evidently a machine tool as is a press drill, though it is for the same purpose within its capacity, but not used in the same way for drilling holes. The breast drill is hand operated and the human frame is depended upon to form the bed that holds the drill in proper relation to the work, or the drill may be driven by compressed air or an electric current energizing a suitable motor, but in neither case is it usual to call the contrivance a machine tool.

The Question of Portability

Portability may be a feature that determines the status of the breast drill among the collection of machine shop tools. Such has been one of the assertions. But if the breast drill were clamped to a vise holding the work and also providing for feeding the drill through the metal it presumably would not thereby become a machine tool. Post drills are somewhat of this type and when sturdily built and clamped securely and rigidly to a firmly set column or girder of the machine shop structure, the combination of building plus drill has many if not all the components of a machine tool.

Machines of this type are not always to be despised. An instance comes to mind where a milling machine in an engine shop has its supporting column in the latticed pillar that also holds up a crane runway, and the convenient location and its rugged ,homely construction gave it a chance for utility that was freely and frequently employed with abundant satisfaction.

However, if the bolting into fixity of tenure does not make the formerly portable tool or implement essentially a machine tool, how is it when the metal cutting tool has weighty proportions, and yet is often moved from place to place about the shop? There are machine shops where the work is of such immense dimensions that it is easier in many instances to move the machine tool to the work than to bring the work to the machine. The castings are lined up on a floor made of massive slabs of metal provided with T-slots for the bolts of the hold-down straps and clamps. The machines are brought up to the work by means of the crane service and then, as in the case of the heavy castings, the machines are secured accurately in position and the metal is machined away in machine-tool fashion.

Such machines are portable under the conditions there obtaining; nevertheless, in respect to precision of tool-grinding surfaces, the material they work, the sturdiness of their design, the power transmitted, or the means employed for using that energy—in all these respects they are none the less comparable with other machine shop machinery commonly classified as machine-tools.

Use in a Machine Shop as a Limitation

Now, if we narrow the significance of the term, by way of returning to the old use of it, we may get a foundation for the further developments, no matter whether they do or do not lead to the working of other materials than metals. Perhaps we will all agree that a metal-cutting machine for use in a machine shop for the manufacture of machine components is a machine tool. Such a definition would at once remove every consideration of all metal-working machines designed for use outside machine shops. In that event we should not include wire-drawing machinery or pipe mills, or steam hammers as machine tools.

A precision grinding machine is obviously a machine

tool according to the above definition. How about the machine shop grindstone? Well, that brings up another feature—the accuracy of the operation and the purpose of the output. If the grindstone is employed for the sole purpose of tool grinding then it does not come in the above category, it does not manufacture machine components.

There are several considerations entering into the case of grinding even in the last instance here cited. The writer has known copper rolls to be finished in a machine shop with a stone. The machine was crude—mainly lathe—but the result was excellent in appearance though rather slow of execution. It is not difficult to imagine a powerful lathe type machine with the copper roll rotating in water and smoothly surfaced to close measurements by a grindstone, copper not being nearly so tractable a material to work in some other methods that could be named. Such a machine as the one described would be worthy of being called a machine tool, though first cousin to the humble grindstone. At any rate, it fully meets the requirements of the definition just given.

And further as to dimensions: A speed lathe may be a machine tool, even if there are speed lathes that do not seem to meet the requirements of modern machine shop practice, and in the case where they were seen a doubt was raised as to their rightful place in the plant. The shop atmosphere was not helped by their presence.

Here again we have the question of fitness for machine shop work. That is *the* test. If the machine is unfit for use in the machine shop then it fails to meet the test of the definition which has been here mentioned as being probably of fairly general acceptance.

Defining on Broader Lines

Of course, the definition may be enlarged, as is done when it is applied to the machinery built on machine tool principles, but for other than machine shop purposes. In that manner we arrive at a series of definitions to meet all ordinary needs, content with the reflection that the lexicographers follow the same practice. Take your choice.

Machine tools:

a. Metal-cutting machines for manufacturing machinery or parts thereof.

b. Metal-cutting machines for high-grade service in machine shops.

c. Machines for cutting or shaping materials and built on such similarly substantial and accurately operating lines as to deserve by commercial courtesy the name of "machine tools."

d. Metal-cutting machines of an ample supply of practically proportioned and judiciously disposed material throughout their design, having superior precision and convenience of adjustment, and of marked economy in the use of energy for the removal of metal, and exhibiting excellence in craftsmanship by repeated accuracy and quantity of product in the intensive manufacture of machine components.

e. Modern machine shop machinery used at high pressure for cutting metals.

f. Metal-cutting machinery for making machines.

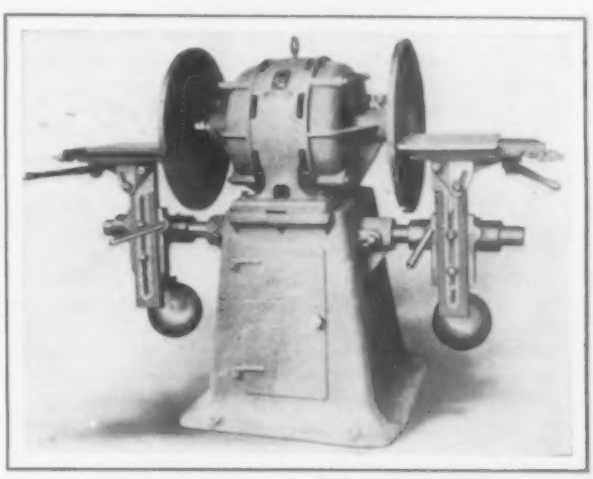
Private Car Investigation

The Interstate Commerce Commission announces that it will make an investigation into the matter of private car lines, and that it has mailed to railroads, to companies owning or controlling private cars, and to individual owners of private cars a series of interrogatories designed to serve as the basis of public hearings to be hereafter held. The commission's preliminary investigation discloses that there are 1200 companies or individuals owning private cars, in practically every industry, and the statement is made that this ownership has led to payments which might be construed as rebates, and the commission makes the investigation with the object of directing reforms if necessary. The questions designed by the commission aim to develop the exact number of freight cars in the country and the use to which they are put. In addition to this it is expected to develop the interrelationship of companies owning cars with the railroads and to determine whether the railroads really lease cars to themselves as charged.

Motor-Driven Lever-Feed Disk Grinding Machine

A number of improvements have been recently made by Charles H. Besly & Co., 118 North Clinton street, Chicago, Ill., to its regular line of disk grinding machines. These include the addition of a geared feed table and electric motor drive, which makes the machine essentially a manufacturing tool designed for use in nearly all industries for making, perfecting and finishing flat surfaces in metal, wood and other materials. This machine can be operated by unskilled labor, and emphasis is laid upon the fact that the work for which it is adapted is done in a fraction of the time required by a lathe, file, grinding, shaping or milling machines, or other types of surface grinding machines.

The work to be ground is laid on the face of the disk wheel and the grinding is done by the lever feed. The use of an adjustable table enables the work to be held in any position which is advantageous for grinding and to be forced against the abrading disk by a hand lever with sufficient pressure to secure the maximum efficiency of the machine and the grinding circle without undue exertion on the part of the operator. Sufficient feeding pressure to rough grind quickly is provided by the lever feed table, which has angular adjustments and micrometer stop screws, so that work may be ground accurately to the required angles and sizes. The use of this work table made it necessary to provide additional driving power and improved means for receiving the heavy end thrust on the spindle, and in consequence, motor drive was selected, a



A New Lever Feed Disk Grinding Machine with Motor Drive

15-hp. Westinghouse motor being used. The driving motor has extra heavy thrust bearings, brackets and shaft, and the windings are designed to withstand the heavy overloads to which the outfit may be subjected.

The grinding is done by emery or other abrasive cloth sheets, called circles, which are glued to the faces of steel disk wheels. These wheels which give the machine its name are usually from 12 to 53 in. in diameter, according to the size of the pieces to be ground, and of sufficient thickness, from ½ to ¼ in., to withstand the stresses and requirements encountered in actual service. The wheel is made of wrought steel and is machined with care to run in perfect balance at a considerably higher speed than is practicable with the ordinary solid emery wheel. The speed at which the abrasive travels varies from an average of 7500 ft. on softer materials to 6500 ft. on harder ones. When the circles become worn, they can be removed from the wheels and new ones cemented and pressed on.

Exhaustive tests, covering a variety of disk grinding machine work, have shown that the total amount of feeding pressure exerted in rough grinding different work varies from a few pounds up to a maximum of 80 lb. In exceptional cases a pressure of 100 lb. per square inch of ground surface can be used without producing destructive effects on the circle.

The execution of the orders for 12,305 cars recently placed by the Pennsylvania Railroad will require 286,100 tons of steel and a total outlay on the part of the railroad of $17,036,575.

Factors in the Valuation of Iron Mines*

They Are Chiefly the Price and the Amount that Can Be Marketed—Lake Superior Mines and Their Competitors

BY JAMES R. FINLAY.†

Our present ideas of mine valuations were mainly originated by H. C. Hoover, whose point of view was almost strictly at that time that of an English investor in gold mines. Hoover's ideas, or their equivalent, were first used extensively in America by J. Parke Channing and others in working out a value for the "porphyry coppers." From thence they have spread to a more or less general acceptance. The cardinal principle of Hoover's system of valuation is simply that the value of a mine is a capitalization of future profits. Given the margin of profit in an ore, the amount of ore, and the time required to get the profit, the value is merely that profit as it will appear in a series of dividends discounted back from the future date of payment. I most heartily subscribe to this principle and believe it to be the only one worth considering; but, like every other general principle, it is only the starting point for many complex deductions. For example, an ore which is not marketable at all to-day may be highly in demand 20 years from now. It would be foolish to apply Hoover's principle to support an argument that because an ore has no present market it has no present value. The fact is that the conception of profits depends on:

1. The value of an ore; that is, its average price.
2. The average cost of getting it out and getting it to final market.
3. The amount of ore and the rate of getting it out.

Gold Mines Contrasted with Iron Mines

When we consider how these factors apply to different kind of mines, we find that with gold mines the first factor presents no uncertainty whatever. Gold is not only marketable at a fixed price, but in unlimited amounts. The gold miner does not have to consider either how much of his product he can sell or what he will get for it. Inasmuch as his gold commands a fixed market, so his gold ore is always in the market. He immediately transfers his attention to the quality and quantity of it. Now, if gold were not hard to find, gold ore would not have an unlimited market. Therefore, the prime uncertainty is the ore itself. In spite of the fact that development is carried on as fast as possible in the average gold mine, the amount of ore is usually the principal subject of uncertainty. Once mining is successfully established, the cost is practically determined; so that almost the whole matter of valuation is the life of the mine.

Now, if we turn our attention to iron ores, we find ourselves confronted with different circumstances. Omitting discussions of properties in the prospecting or developing stage, which have little or no influence in the markets of the world, we find that iron ores of good grade are known in immense quantities running up into billions of tons. In the large, therefore, the question is not primarily the supply of ore. The main questions are decidedly the price at which it can be sold and the amount that can be marketed each year. In valuing iron mines in comparison with gold or copper mines, we transfer our chief uncertainties into quite a different channel. With most iron mines the difference in valuation caused by using the minimum estimate of ore or the maximum estimate of ore upon the property will not be so great as the difference produced by a variation of 10 per cent. in the price to be received for that ore at the blast furnace.

The Lake Ore Problem

For convenience and to get a concrete illustration to argue about, let us have in mind the Lake Superior mines. The factors which I will take to be vital for any iron ore field are the following:

1. Ores that are pure enough to be inherently desirable for iron smelting and manufacture.
2. A great volume of such ores, sufficient to warrant the great investment of capital in the steel business. This naturally demands a firm foundation in assured ore supply.
3. The assurance that such ores can be supplied within the industrial field to which they belong at least as cheaply as ores from any other source.

I propose to point out as definitely as possible how the Lake mines meet these requirements. The first thing to do is to define the field they supply.

Lake Superior iron ore goes into an industrial field of the first magnitude. It is rivaled only by a similar field in Europe which comprises roughly the middle third of Great Britain and a tract on the Continent covering Belgium, northern France and western Germany. The American field is a rough ellipse, the axis of which runs from Philadelphia to Chicago, and whose sides are Lake Erie on the north and the south boundary of Pennsylvania on the south. The major axis is near the path described by the American center of population in its progress westward. That center has reached a point in Indiana, not very far southeast of Chicago. Pittsburgh is about the middle point of the whole field. A moment's reflection will show that this area is precisely that area which has the closest contact with the main portion of the population of the United States and Canada; that since the densest part of the population is east of the center of population, so the most active industrial area is naturally east of it; that the area is best situated geographically for economical distribution to the bulk of consuming demand, for all kinds of manufacture. Lake Superior iron ore enters this region from the north and there meets its necessary complement, the great fuel supply from the Appalachian coal field, which lies just to the south.

It is little wonder that this area has become preponderant in iron manufacture; that it accounts for from 80 to 90 per cent. of the whole iron business of the country.

Now, I invite attention to this inference: If Lake Superior can meet any competition as far east as Pittsburgh, it is bound to supply half of the iron used in this field. If it can meet outside competition all the way to the coast, it is bound to supply nearly the whole demand. I propose to argue on this basis. I propose to leave out of account the extraneous or gratuitous factors of taxes, royalties, and profits, which are merely consequences allowed by the natural advantages which these ores enjoy, and to consider only the fundamental factors of:

1. Cost of mining.
2. Distances of transportation (*a*) by land, and (*b*) by water, of these Lake ores against any known or likely rivals.

Present metallurgical practice seems to be to treat the Old Range ores as an accessory to Mesaba ores,* using them as a desirable mixture. The proportions are about 70 tons of Mesaba to 30 tons of Old Range. As near as I can make out, the average mining cost of all these ores, omitting taxes, is about 60 cents a ton for Mesaba (largely steam shovel) and about $1.50 for the others (all underground). I am talking about complete costs, including everything except initial plant. This figures for the whole product 87 cents a ton. The average iron content of these ores I believe to be about 52 per cent. natural. This means that the average mining cost is 1.67 cents per unit.

*From a paper presented at the New York meeting, February, 1913, of the American Institute of Mining Engineers.

†Mining engineer. Mr. Finlay was engaged in 1911 by the Michigan State Board of Tax Commissioners to appraise the iron mines of the State for taxation.

*The Mesaba Range is pretty thoroughly explored and about 1,500,000,000 tons are developed. The Old Ranges are not so fully developed, in spite of being generally older. They have from 300,000,000 to 400,000,000 tons of ore developed. Annual shipments from the Mesaba are about 30,000,000 tons, from the Old Ranges from 12,000,000 to 15,000,000 tons.

Cost of Lake Ores at Pittsburgh

Let us take this ore to Pittsburgh as the central point of the manufacturing field. For 70 per cent. there is a land haul of about 90 miles to lake, and for 30 per cent. a land haul of 37 miles; the average is 68 miles. The 70 per cent. has a lake haul of 850 miles and the 30 per cent. has a lake haul of 650 miles; the average is 790 miles. From Lake Erie to Pittsburgh all ores have a land haul of 160 miles. The total land haul is 228 miles over a level country, with a preponderance of down-hill pull for the loads.

All lake haul is over the protected waters of inland lakes. Both factors are highly favorable. Land haul appears to average at present about 0.66 cent per ton mile; lake haul about 0.09 cent per ton mile. These figures are accurate enough for practical purposes. Applying them, we get the following costs at Pittsburgh:

	Cents per unit.
Minings, 87 cents per ton	1.67
Land haul, 228 × 0.66 = $1.50 per ton	2.89
Lake haul, 790 × 0.09 = 0.71 per ton	1.37
	5.93

Lake ores are sold on the basis of four standard grades, as follows:

	Nat. iron (undried) per cent.	Iron (dry) per cent.	Phos. per cent.	Moisture per cent.
Old Range Bessemer	55	61.12	0.045	10
Mesaba Bessemer	55	61.12	0.045	10
Old Range Non-Bessemer	11.50	58.52	.....	12
Mesaba Non-Bessemer	51.50	58.52	.....	12

For Bessemer ores a premium is allowed for phosphorus less than the standard.

For all ores allowances are made for iron contents varying from the standard. Silica is also carefully taken into account. For a penalty, see Hurd's "Iron-Ore Manual."

Ore is one-third Bessemer. The Bessemer quality is worth 50 cents a ton additional; say, for the average, 17 cents additional	0.33
Total base value	6.26

Now let us look at some competitors. Cuba can produce 1,000,000,000 tons or more of iron ore, which when roasted or "nodulized" will also contain 52 per cent. of iron. The ore is all low in phosphorus and contains 0.75 per cent. of nickel. These factors will, I believe, make it a formidable rival. I will count in the Bessemer differential, but because the nickel is not yet established as a premium factor, we will neglect that, except to consider the nickel as so much iron.

	Cents per unit.
Cost of mining, say, 27 cents per ton, 40 cents nodulized	0.75
Nodulizing, $1	1.89
1,200 miles sea haul at 0.09 = $1.08 per ton	2.04
375 miles land haul at 0.66 = $2.70 per ton	5.09
Total cost	9.77
Value of Cuban---Lake Superior base cost	5.93
Add Bessemer quality—70 cents per ton	1.34
(I estimate Lake Superior Bessemer at 0.45 phos. Cuban ore is much lower, 0.25, and for this commands a premium.)	
Total base value	7.27
Differential in favor of Lake Superior	2.50

This is equal to $1.30 per ton at Pittsburgh.

The only other field which can figure in billions of tons is Brazil. Let us appraise its factors. The ore fields are in the tropics in a mountainous country, 380 miles from the sea, with plenty of rain. Rail haul will cost more than in the Lake Superior region, but let us ignore that. Let us take mining at any figure you please, say 25 cents a ton, and let us take the ore to be 62 per cent. of Bessemer, natural.

	Cents per unit.
Its base value will be	5.93
Add Bessemer quality (phos. 0.045)	1.00
Total value	6.93
Its cost will be:	
Mining, 25 cents per ton	0.40
Land haul, 730 miles at 0.66—4.82 per ton	7.77
Sea haul, 5,700 miles at 0.09—5.13 per ton	8.27
Total cost	16.44
	6.93
Differential in favor of Lake Superior	9.51

This is equal to about $5 per ton of Lake Superior ore.

Point of Equilibrium in Competition

Now, there is bound to be a point where Lake Superior will meet both Cuba and Brazil on equal terms. This point will be, in terms of land haul, that distance east of Pittsburgh where its freight will equal half the differential in favor of the Lake Superior ores which exists at that point. In the case of Cuba that differential is $1.30 per ton. One-half of that is 65 cents. In terms of freight at 0.66 cent per ton mile, this means 100 miles. Cuban ores, therefore, will meet Lake Superior ores at that point on even terms, and east of that place they will have the advantage. Very roughly, this gives to Cuba about one-quarter of the manufacturing field. I see no reason why Cuba cannot establish for that proportion of the industrial field substantially the same position which the Mesaba Range has in the Lake Superior field; that is, it can furnish, say, 70 per cent. of the iron.

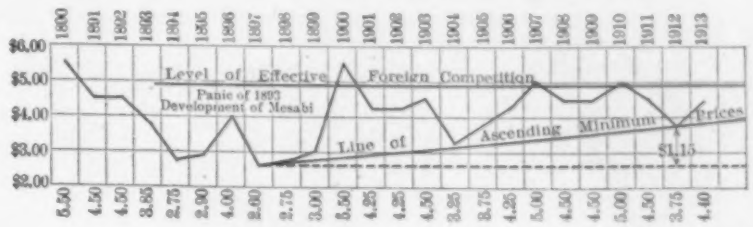


Chart of Iron Ore Prices, Showing Effect of Discovery of Mesaba Iron Range and Panic of 1893. Prices are for Old Range Bessemer Ore

In the case of Brazil, the differential is equal to about 388 miles land haul east of Pittsburgh. Brazil cannot, therefore, compete even on tide waters. At that point Cuba has a differential of 7.73 cents a unit, or $4.10 per ton, over Brazil.

It may be argued that outside ores may be brought in with lower freight rates than I have used. I answer that any such argument is a question of competition in transportation, not competition in iron ores. It cannot be seriously urged that Americans can do better work on the Atlantic ocean than on the Lakes, or build better railroads in Brazil than in America. Whenever transportation has to compete, it will do so on its basic advantages. It is very possible indeed that estimates of transportation cost much lower than those of our Lake region may prove to be practicable; but if they do it only means that transportation costs there are too high and may be reduced.

In this argument I have omitted two factors of competition which have some bearing. There is a duty of 12 cents a ton on Cuban ores. This is equal to an 18-mile land haul. Our meeting point, therefore, will have to be moved that much further east of Pittsburgh.

Another factor is difference in initial plant cost at the mines. I believe this factor to be in favor of Lake Superior, because the cost of a nodulizing plant per annual ton is probably greater than that of the average Lake Superior mining plant; but I do not think that this will make a difference of more than a few cents, probably 5 cents a ton. It must be remembered that docks, boats, railroads, etc., are transportation factors, and I believe they are nearly identical for the two fields. If Atlantic boats cost more per carrying ton they can work 12 months a year, against 7 months on the Lakes.

In both fields some properties are at an advantage or disadvantage, as the case may be, compared with the grand average used in this comparison. In Cuba I have allowed a railroad haul of 25 miles. Some properties will not have this. On the whole, I see nothing to vitiate the conclusion that Cuban ores have a basic advantage up to a point 100 miles east of Pittsburgh without the tariff, and 125 miles east of Pittsburgh with the tariff.

Population of the United States and West Indies where Cuban ores have the advantage, omitting Georgia and Alabama, but including Florida, is about 31,000,000.

Influence of Above Facts Upon Prices

It should be evident from the above that Lake Superior ores are firmly established in the greater part of our American iron manufacturing field. The only possible competition that appears to be important is that from

Cuba, and even that is only incipient. Even if Cuban ores do come in to displace Lake Superior ores in one-quarter of this field, the total effect on the Lake markets is likely to be inconsiderable. In the first place, the demand for iron and steel in America is expanding, and the need for ores is increasing at the rate of at least 25,000,000 tons each decade. The importation of from 8,000,000 to 10,000,000 tons a year of these Cuban ores will seem a bagatelle in the development of the next ten years, and they cannot be brought into the market at a rate fast enough to influence greatly the market. Besides this, it must be taken for granted that Cuban ores will not be marketed except at remunerative rates, and this fact will automatically protect Lake Superior owners in a large part of their profits, particularly in that great interior market which apparently must always remain exclusively their own.

It seems fair, therefore, to conclude that the differential in favor of the Lake Superior ores at Pittsburgh, which seems to be a central and representative point for the whole field, is about $1.30 per ton against the nearest competition; that in spite of any possible introduction of outside ores into the eastern part of the field, the total demand from the Lake Superior mines is sure to increase instead of diminish, and that even now the price of the Lake Superior ores is governed more by competition from within than by competition from without. The proof of this is that the actual profit from such ores is less than that warranted by their advantages over foreign competition at Pittsburgh. In 1911 my conclusion was that the Michigan mines were fairly secure in a margin of $1 a ton profit, including royalties. It appears that this profit is only 80 per cent. of what they might expect if they were to meet Cuban competition on even terms.

The Depressing Influence of the Mesaba

It has always seemed to me that the discovery of the Mesaba Range introduced into the Lake region a period of intense internal competition on a scale not likely to be repeated, and under circumstances not likely to be repeated. At that time the Mesaba was like a foreign field, rudely replacing the established producers, and making them fight for their lives. The Old Range mines had shipped in 1890 and 1892 nearly 10,000,000 tons a season; but in 1893 and 1894 the demand from the whole field was only 7,000,000 tons a year. With a lessened demand, the supply was being increased by leaps and bounds by enormous discoveries of fine ore which could be mined by steam shovels. Is it any wonder that iron ore seemed ridiculously easy to get? These circumstances all concurred at a time of universal low prices. Every staple of commerce reached its record point of cheapness about 1894; after that time a rising scale of prices set in which has continued to the present day.

As soon as the disturbance produced by the appearance of the Mesaba Range could adjust itself the price of Lake Superior iron ores began to reflect more and more their natural advantages. I have believed that an estimate of their future price should be based upon their fluctuations since the time when the untoward conditions just described as not likely to be repeated had disappeared. If we had another Mesaba on the horizon I should try to take it into account; but as such a phenomenon appears to be less and less likely I think it logical to believe that iron ore prices will crowd more and more closely to the level allowed by grand scale competition from foreign fields.

The Course of Prices Since 1890

As an interesting commentary upon these considerations let us take the course of prices since 1890. The Old Range Bessemer ores will serve this purpose, although it should be noted that these ores do not represent the average Lake ore considered in the comparisons given above. Fig. 1 shows the yearly prices at Cleveland.

The value of these ores at Pittsburgh, reasoned out according to their basic factors in competition, I calculate as follows:

Iron value, 55 units at 5.93 cents	$3.26	per ton.
Bessemer quality	.50	per ton.
Premium for texture	.25	per ton.
Differential over Cuban ores	1.38	per ton.
Total competitive value at Pittsburgh	$5.39	per ton.
Less freight from Cleveland	1.00	per ton.
Base value at Cleveland	$4.39	per ton.

Now, since the competition is based upon the bare operating cost of Cuban ore, with no allowance for commissions, duty, amortization of nodulizing plant, royalties, or profits, it is plain that this base price is not a commercial basis of competition, but a price at which Cuban competition will be impossible in the Pittsburgh field. If we may believe that Cuban producers might be willing to assume all these costs for a margin of 50 cents a ton, which seems narrow enough, we are forced to conclude that the competitive level for this grade of ore at Cleveland is about $4.90 per ton.

Now, the actual average of prices from 1897 to 1913, inclusive, is $4.10 per ton. The average of lowest prices on the chart for the years 1897, 1904, and 1912 is $3.20 per ton. But each succeeding cycle of low prices has not been so low as the preceding one. The low price of 1912, $3.75, was $1.15 per ton higher than the low record of $2.60 in 1897. Furthermore, we see that the average price for the 17 years has been 90 cents a ton higher than the sloping base level of lowest prices. It seems legitimate to believe that average prices have actually advanced $1.15 per ton between 1897 and 1912; that in 1897 prices were fluctuating above a minimum of $2.60 per ton and in 1912 above a minimum of $3.75; that if the real average is 90 cents a ton above the low average of a period of years we might as reasonably calculate that $4.65 is an average price for these ores in 1912 as that $3.50 was an average during the late 90s. As a matter of fact, the average for the seven panic years, 1893 to 1899, inclusive, was only $3.12 per ton. In 1911 I based my estimate of the ruling price for these ores on a seven-year period, 1904 to 1910, inclusive, and obtained a figure of $4.50. I adopted this figure for my valuations, thinking that those years represented both good and bad commercial conditions covering about the same number of years before and after the panic of 1907. It has been hard to feel that this was good reasoning, especially facing the fact that prices dropped after 1911. Nevertheless, an average obtained by using the seven years ending 1911 or 1912 would yield the same figure.

Predicted Bessemer Ore Prices Above $4.50

The considerations enumerated in this article have fortified me considerably in the belief that the figure I adopted in 1911 was reasonable, after all. I now think that the logic of the situation points to a price of between $4.50 and $5 a ton for Old Range Bessemer at Cleveland, and that prices either lower or higher will only be temporary. These figures I believe are trustworthy as long as transportation rates remain on their present basis. Foreign ores can only disturb the equilibrium by means of lower freight rates. If such rates are put in force so as to permit important foreign competition the rates in the Lake country will come down. The mine owners, at any rate, should be fairly protected in a margin of profit approximately equal to that allowed by the above prices and present rates.

Discussion

John Birkinbine, Philadelphia, presided at the session at which Mr. Finlay's paper was read. In referring to the valuation of ore properties, he mentioned that ore prices had not an upward but rather a downward tendency, though the deeper the mine the more expensive is it to secure the product and the more expensive is the equipment necessary for the work. Drillings are taken to ascertain the promise of mines and then one finds that the very fact that the drillings were made has resulted in an increased valuation.

Benjamin W. Vallat, superintendent of the Newport Mining Company, Ironwood, Mich., considered that the system of valuation for the purpose of taxation should have the careful consideration of a body of men who know something of the subject.

R. Van A. Norris, consulting engineer, Wilkes-Barre, Pa., mentioned that Pennsylvania requires taxation on the salable value and has undertaken, for example, to tax coal still in the ground. He referred to some 1907 assessments that were still in litigation. He felt that the best basis is to tax for one year on the production of the year preceding.

Gas Producers for Small Heating Furnaces*

The increased cost of natural gas and fuel oil has created a demand for some substitute for these fuels in small heating furnaces, and it is from producer gas that a solution of the problem is expected. In work of this character, little has been done with producer gas and information along this line is difficult to get or is entirely lacking. For the supply of such furnaces it will be necessary to cool and clean the gas in order to avoid any clogging in the gas distributing system; the sensible heat of the gas as it leaves the producer will thus be lost, and any tar compounds that it may contain and which are high in heat value will also be lost.

It is said that with an average gas, thus cleaned and cooled and burned in a small heating furnace, temperatures of 1700 to 1800 deg. F. are readily obtained, and in work requiring no higher temperature there is no reason for serious difficulty. A few installations have been made where temperature requirements are not high, such as for tempering, case hardening and heating soldering irons, and in these instances satisfactory results are reported. But in furnaces requiring higher temperatures, such as welding heats, small crucible furnaces, and heating material for bolt and rivet machines, the situation is uncertain; little is known, but the experimental stage of this development is well started. Reports from abroad on this phase of producer gas utilization are indefinite.

So far as is known to the writer, there is but one plant in the United States where an attempt is being made to utilize producer gas for heating small crucible furnaces. Clean cold gas of about 120 B.t.u. per cu. ft. is used; the gas and air for combustion are preheated by means of the waste gases to about 600 deg. F.; each furnace contains a crucible holding about 200 lb. of brass. Reports already received indicate that satisfactory results have been obtained; it is stated that the heat is ample for the purpose and that it is uniform. If continued tests confirm the results as reported, the outlook is bright for the application of producer gas to this type of heating furnace.

In applying producer gas to new uses, and more particularly when it is to be used as a substitute for such a fuel as natural gas, we must keep in mind the great difference in the composition and heat value per unit volume of these two gases. Quite recently a man made inquiry concerning the feasibility of substituting producer gas for his failing supply of natural gas in a factory where there were several long lines of small gas pipe. He was very much surprised and disappointed to learn that none of his piping was large enough for producer gas.

In burning 1000 cu. ft. of natural gas, approximately 1,000,000 heat units are developed and this combustion requires about 10,000 cu. ft. of air, thus making 11,000 cu. ft. of gases which enter into the burning process; and of this about 8000 cu. ft. are inert gases or diluents which cannot be avoided and which absorb heat. With producer gas, of say 125 heat units per cu. ft., it will require 8000 cu. ft. to yield 1,000,000 heat units; approximately 8000 cu. ft. of air will be required for its combustion, making in this case 16,000 cu. ft. which enter into the burning process and of which over 11,000 cu. ft. are diluents. With natural gas the evolution of 1,000,000 heat units involves the heating up of 11,000 cu. ft. of gases; with producer gas the evolution of 1,000,000 heat units involves the heating up of 16,000 cu. ft. and the volumes of gas for each case are as one to eight.

If we measure the world's industrial development by the consumption of fuel, it is readily seen that we are progressing at a rapid rate, and as a period in the lifetime of a nation we have been using mineral fuel but a short time and we have learned little about it. The first fuel consumed was used in a crude way and most of the heat was lost. Although at the present time we are beginning to realize the desirability of more economic utilization we are still very wasteful. In the efforts of the future to conserve the fuel resources and to utilize waste materials, the gas producer is destined to play an important part and it is the firm belief that it is now entering upon a period of healthy and steady growth in its application to industrial pursuits.

* From a paper by C. D. Smith, United States Bureau of Mines, Pittsburgh, Pa., read before the Cleveland Engineering Society, February 11.

A New Portable Steel Hoist for Machine Shops

For handling heavy material in machine shops and placing it in lathes and planing and drilling machines, the Lafayette Engineering Company, Sharp Building, Lafayette, Ind., has brought out a portable hoist which is built entirely of standard structural steel sections. The crane has a low base, and with its hight of 8½ ft. it is designed to handle all the work met in the ordinary run of machine shop

A New Type of Portable Machine Shop Crane Built of Standard Structural Steel Sections

operations. It has an overhang of 3½ ft. from the upright column to the center of the hook. The low, broad base, it is emphasized, makes the crane difficult to upset or fall over. Two locks are provided for the lifting winch, which give an additional safety feature. The lifting capacity of the crane is 2½ tons and the shipping weight is 900 lb.

Standard Sanitary Mfg. Company Changes

President Theodore Ahrens, Louisville, Ky., announces that E. L. Dawes retired March 1 from the active management of the Standard Sanitary Mfg. Company, and has resigned his position as general manager of factories, which he has occupied since the company was organized, in order to devote his energies to the Standard Sanitary Mfg. Company, Ltd., of Canada, as its president. This change was made necessary by the fact that the Canadian interests are now so large and important as to make it necessary for Mr. Dawes to give them his entire time and attention.

The following appointments have been made by the executive committee, effective March 1: M. G. McKinney, as general manager of factories; H. M. Reed, as assistant general manager of factories; Theodore A. Mueller, as manager of Ahrens & Ott Works; Lafe Stoesser, as superintendent of Ahrens & Ott Works. In making these appointments the committee is recognizing merit and promoting men who have served with the company from the bottom up, desiring this action to be an incentive to every other man connected with the company and to encourage him to his best efforts.

The offices of general superintendent of enameling, heretofore occupied by W. G. McKinney, and general superintendent of foundries, heretofore occupied by John C. Reed, have been abolished by order of the executive committee. John C. Reed has been appointed consulting engineer for the company, with office in the Bessemer Building, Pittsburgh, Pa., and will continue in that capacity to give the company the benefit of his long and valuable experience.

S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

Large Direct-Current Generators

The Units Recently Installed at Cleveland—Reasons for Selecting this Type

While the size of alternating-current turbo-generating sets has been gradually increased until the 20,000-kw. units installed at the Waterside station of the New York Edison Company in the fall of 1911 represent the largest unit of that type, and 30,000-hp. units are projected for the additional requirements of the New York subway developments, direct-current generators have not been produced in such large capacity. Recently the two largest direct-current generators which it is believed were ever built were completed by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., and are now installed in the Canal Road plant of the Cleveland Electric Illuminating Company. These are two 3750-kw., 275-volt, shunt-wound units driven by steam turbines at a speed of 180 r.p.m. through Westinghouse reduction gears, having a ratio of 10 to 1. The photograph from which Fig. 1 was reproduced was taken while the machines were being tested in the builders' works and shows a workman of slightly above the average hight in the foreground, thus serving to give some idea of the dimensions of these machines. The large gear of the speed reducing mechanism employed is shown in Fig. 2.

The two machines will supply light and power for the business section of Cleveland. The distribution system in this portion of the city was originally of the three-wire Edison type, but as the business increased alternating current was distributed to the outlying districts. The downtown congested business district, however, was never changed and is still fed from the old three-wire Edison system, the company also furnishing steam heat to this district.

The power plant located on Canal Road on the banks of the Cuyahoga River, was a combination alternating and direct-current station. The direct-current part of the station consisted of engine-driven generators, having an aggregate capacity of 8000 kw. and the alternating-current end consisted of about 22,000 kw. in turbo-generating sets. The rapid growth of the station and the fact that the condensing water obtained from the river was bad, led the electric light company to select a location at the foot of Seventy-first street, on the Lake front, and a new alternating-current generating station with an ultimate capacity of 200,000 kw. was built. The location of this new plant is between three and one-half and four miles from the business center of the city. On account of the fact that steam heat had to be supplied, it was not possible to abandon the Canal Road station entirely, and it was decided to make it exclusively a direct-current generating station from which steam could be supplied, since it was only about two blocks from the center of the thickly populated business portion of the city.

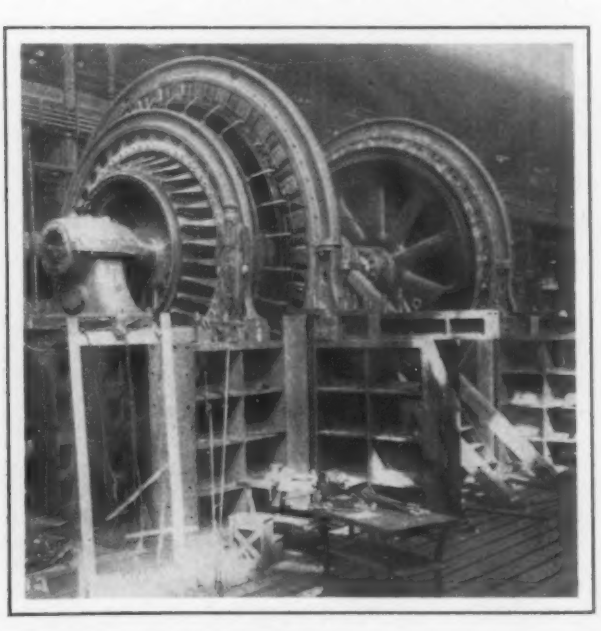


Fig. 1—The Two Largest Direct-Current Generators Ever Built Being Tested

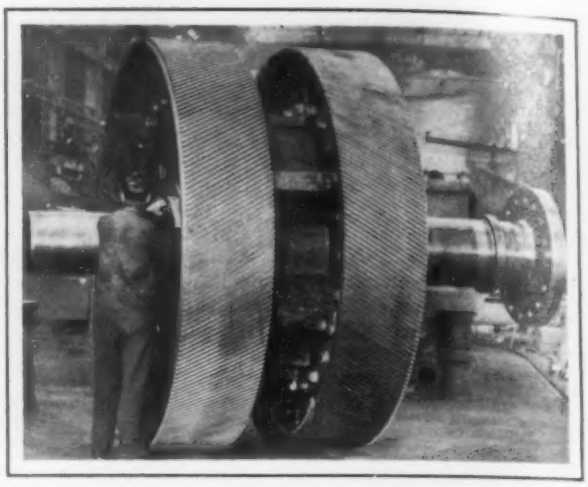
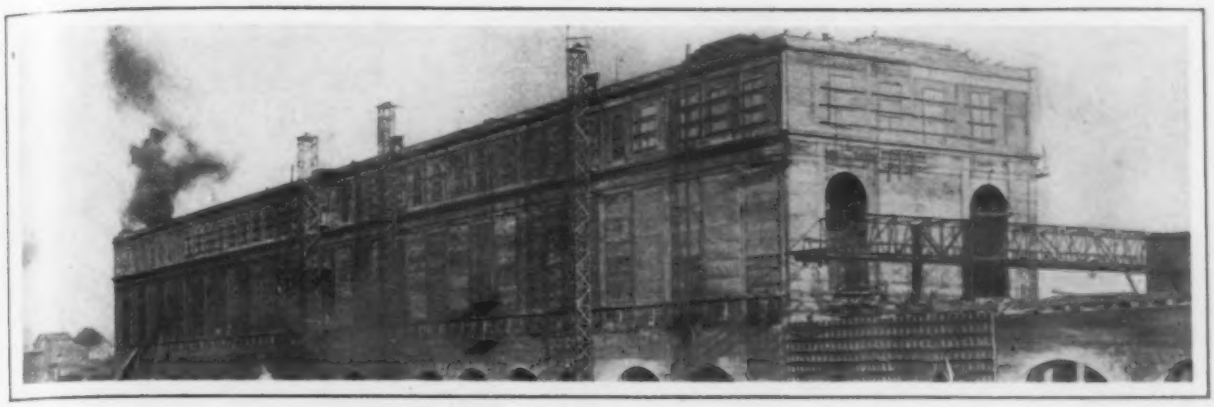


Fig. 2—A Large Reduction Gear Used with the Generators to Reduce the Speed of the Steam Turbines in the Ratio of 10 to 1

After the alternating-current turbo-generating sets were removed from this station to the new powerhouse, nothing was left to furnish steam to the heating system but reciprocating engines. It is stated that the maintenance cost and trouble encountered in running these engines against the back pressure became excessive, and in addition difficulties were experienced from oil getting into the heating system. The question of new equipment then resolved itself into the selection of direct-current generators driven by steam turbines through reduction gearing or alternating-current turbo-generating sets and rotary converters, the turbines in either case to be run non-condensing in order to supply the exhaust steam required for heating. It was found that direct-current outfit was more efficient and was chosen, the size of the unit being determined rather by the amount of exhaust steam required than from the generator capacity needed. It is the intention of the illuminating company to run these generators only during the months in which the exhaust steam is required, the alternating-current station feeding the Edison distribution system through rotary converters during the other months.

Each of the generators alone occupied six carloads when shipped. The armature was shipped on a flat car with the platform removed, the windings extending down to within 4 in. of the ballast on the railroad track. To protect the armature from stones or any other projections on the roadbed, a ⅜-in. steel plate was placed underneath it. Even with the armature at this level, there was only one routing between East Pittsburgh and Cleveland where the clearance was sufficient to permit the armature to pass.

As it was impossible in the present state of the art to build a direct-current generator of this size for operation at high speed, use has been made of the Melville-MacAlpine steam turbine reducing gear, which was illustrated in *The Iron Age*, December 9, 1909. This gear was designed primarily for use in marine work, but is now being extensively used in connection with turbine-driven electric generators. The large gear of this mechanism, shown in Fig. 2, is 100 in. in diameter and has 259 teeth. The pinion has only 26 teeth, and the ratio of 26 to 259 gives the hunting-tooth feature, which it is emphasized, is desirable in the design of toothed gearing. The speed of the turbine is 1800 r.p.m. and that of the generator is 180 r.p.m., which is within the limits of good practice for a unit of this size. The speed of this gear at the pitch line is approximately 54 miles per hour. The efficiency of the generator has been found to be 94 per cent, so that the gear transmits 5350 b. hp., although on several occasions during overload it has carried more than 6000 b. hp., without giving any indication that its ultimate safe output had been reached. This year has an hydraulically supported floating pinion frame, and the dynamometer feature of this construction provides a check upon the accuracy of the instruments that measure the generator output. In this station a considerable error in the calibration of the wattmeter was detected by comparing its readings with those of the power indicator on the floating frame.



The Turbines of the Keokuk Power Plant

The Design and the Foundry, Transporting and Erecting Problems of the 10,000-hp. Units of the 300,000-hp. Development of the Mississippi

BY CHESTER W. LARNER*

Much interest is being manifested by the public at large, and especially by engineers, in the mammoth hydroelectric plant now under construction by the Hydraulic Engineering Company of Maine for the Mississippi River Power Company at Keokuk, Iowa. This plant is remarkable not only for its unprecedented size but also for its many novel features of construction. Not only in power output but especially in physical magnitude, it is by far the largest hydroelectric power plant in the world. The completed plant will contain thirty turbines, each having a rated capacity of 10,000 hp. at the normal head of 32 ft. At the maximum head of 39 ft., which will be obtained under running conditions, the output of each of these units will be approximately 14,000 hp, and at the minimum operating head of 20 ft., the capacity of each unit will be approximately 6000 hp.

The power company has a large auxiliary steam plant available in St. Louis, where a considerable part of the output of the Keokuk plant will be consumed, and which will give it a commercially available primary load, even under the worst conditions, of more than 200,000 hp. It is probable that a large secondary load will be developed in addition to this. There are several plants in this country which will ultimately have an output equal to this, but they are under much higher heads and the magnitude of the construction work is in no respect comparable to that at Keokuk. Furthermore, it should be remembered that, whereas the commercial output of primary power will not greatly exceed 200,000 hp, nevertheless the total installed capacity, based on normal rating, is 300,000 hp. which places this plant in a class by itself. The excess installed capacity is necessary in order to provide for the low-head condition when the power of the turbines is materially reduced.

*Hydraulic engineer, Wellman-Seaver-Morgan Company, Cleveland.

Type and Size of Turbines

The type of turbine and its setting in the power house are both novel in American practice. This is the first important plant designed for large low-speed generators direct connected to single-runner vertical turbines installed in wheel chambers of spiral form built in the concrete foundations of the power house. The spiral casing is a common form in high-head turbine practice, but is always made of metal for such service. The Keokuk casings are built on the same principle but are formed in the concrete from wooden molds.

These turbines run at 57.7 r.p.m., which is the lowest speed thus far recorded in American practice for direct-connected units of this size. At the time this speed was selected, however, it was the maximum obtainable for a single runner under 32 ft. head with high efficiency. The efficiency obtained at the Holyoke testing flume with a small size model of the large runner was over 88 per cent. A further restriction on the speed of the units is imposed by the 20 ft. head condition, at which time it is vitally important to get as much power as possible at 57.7 r.p.m. The speed of these units could have been increased by the use of two runners instead of one, as has been done frequently in the past, but the double runner construction does not give the same degree of accessibility nor the same compactness of installation as the single runner and these defects more than offset the advantage due to the increased speed.

Seven main units and two exciters for this plant were constructed by the Wellman-Seaver-Morgan Company, Cleveland, Ohio, and eight main units are under construction by the I. P. Morris Company, Philadelphia, Pa. Fig. 1 is a shop photograph of an assembled turbine. The structural steel pedestals supporting the crown plate of the turbine shown are not a part of

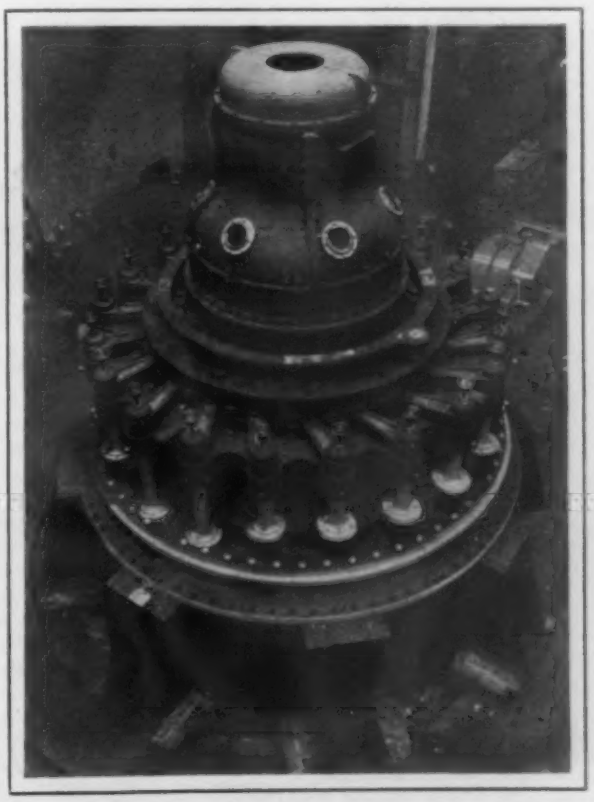


Fig. 1—Shop View of 10,000-hp. Turbine Showing Gate Mechanism

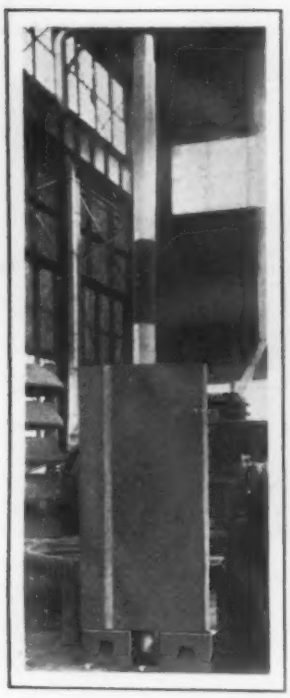


Fig. 2—Turbine Gate or Movable Guide Vane

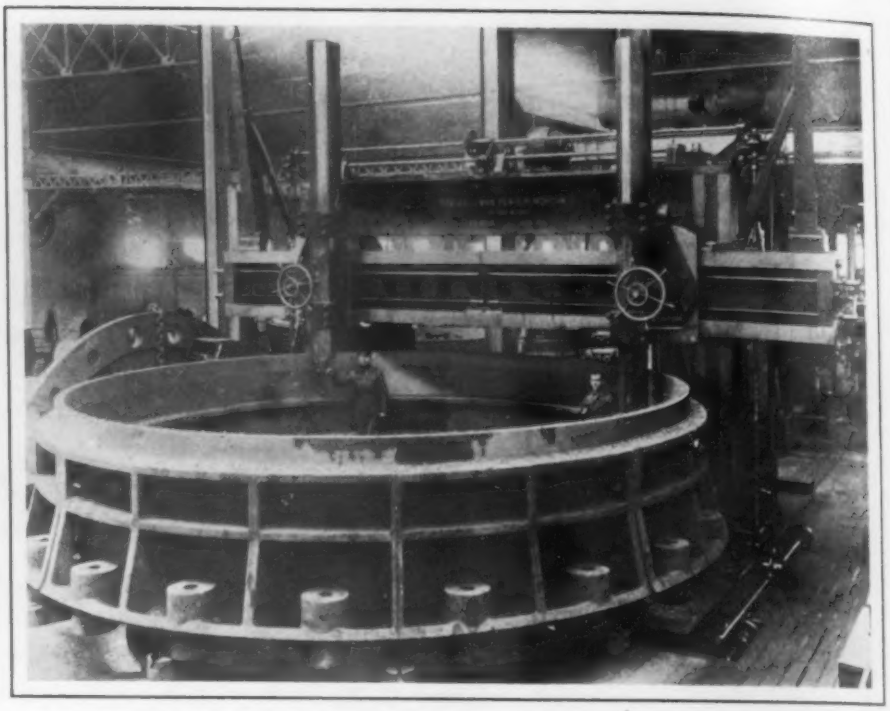


Fig. 3—Upper Foundation Ring on a 31-Ft. Boring Machine Built by the Wellman-Seaver-Morgan Company

the unit. They are used for shop erection only. Each unit consists of a single runner with a set of balanced wicket gates or guide vanes having an operating mechanism of the exposed type under the control of a governor which is placed on the generator floor. The great advantage of the single runner type of unit over a multiple runner type is clearly shown in the fact that all of the regulating mechanism and moving parts of the turbine, except the gates themselves and the runner, are outside of the water passages and accessible for adjustment and lubrication.

The Turbine Gates and Gate Mechanism

The turbine gates, which swing on pivots and control the quantity of water supplied to the wheel, are steel castings, each weighing more than a ton and being larger in dimensions than an ordinary door. Each gate, one of which is shown in Fig. 2, has a hollow forged steel stem passing through it, which stem has bronze bearings in the crown and curb plates at the top and bottom of the gates. These stems are keyed to the gates but may be readily withdrawn if it should at any time be necessary to remove any of the gates for replacement or repair. This is a novel feature in gate mechanism of this type and is only possible with wheels of unusually large size such as these. With wheels of smaller size, the diameter of the gate stem has to be practically the same as the thickness of the gate and it is therefore necessary to cast the stems integral with the gates. This is an undesirable

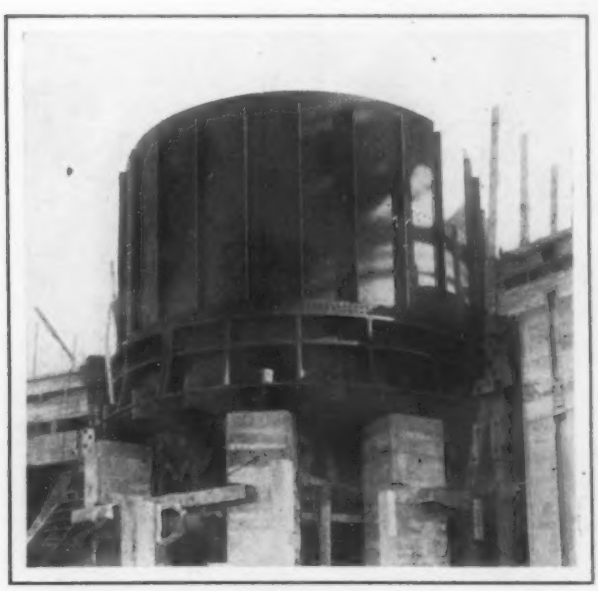


Fig. 4—Pit Liner Erected on Temporary Concrete Piers

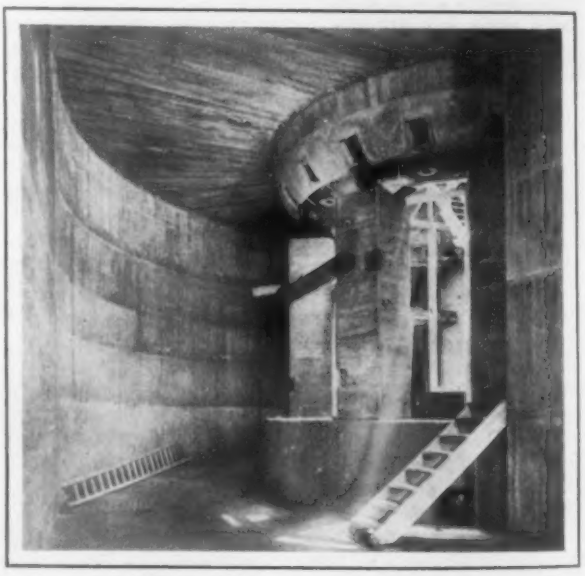


Fig. 5—Wheel Chamber Before Removal of Temporary Piers

detail since it is necessary to raise the entire crown plate of the turbine in order to remove even one of the gates.

All bearings of the gate mechanism are grease lubricated, the lower bearing of the gate stem being supplied by a hole bored through the entire length of the stem. The operating ring is a heavy steel casting, the weight of which is carried on a continuous ring of hardened steel balls. The ring is guided circumferentially by forged steel rollers. These rollers run on eccentric pins which make it possible to take up any looseness between the rollers and the ring and to center the latter accurately. The ball and roller devices are provided not only for the purpose of reducing the friction between the operating ring and its support, but also to eliminate as much wear as possible. This is a very desirable feature because looseness of any of the parts of the regulating mechanism causes lost motion and has a bad effect on the governing.

The operating ring is connected by two forged steel

rods to the crossheads of the regulating cylinders which are operated by oil under 200 lb. pressure. The supply of oil is controlled by the governor placed on the generator floor. The regulating cylinders are located in a gallery intermediate between the generator floor and the wheel chamber. The governor oil pumps and accumulator tanks are also located in this gallery.

The Bearings of Each 10,000-hp. Unit

The main shaft is 25 in. in diameter and about 21 ft. long, with an 8 in. hole bored through it. It has a combination thrust block and coupling at the top, a steel casting, which connects the turbine to the generator. This thrust block is keyed to the shaft and secured vertically by a split retaining ring. The thrust block has a taper fit on the shaft and can be removed if necessary by a special jack designed for the purpose.

There are two main shaft bearings, in addition to the

Fig. 6—Wheel Chamber Showing Removal of Temporary Piers

thrust bearing, both of which are babbitted and lubricated by a gravity supply of oil. The oil supplied to the upper bearing drains into the reservoir under the lower bearing and is pumped from there to the central supply tanks by a small rotary pump driven by the main turbine shaft. The thrust bearing used on twelve of the first fifteen units is a combination roller and oil pressure bearing made by the Standard Roller Bearing Company, Philadelphia. It is arranged for an oil supply at 250 lb. pressure, and is so designed that this oil pressure is sufficient to lift slightly the entire weight of the rotating parts of both turbine and generator, amounting to a total of about 550,000 lb., thus entirely relieving the rollers of the load. While operating in this way, if the oil pressure should fail, the thrust block will settle onto the rollers, transferring the load to them. It is intended, however, under ordinary conditions, to carry the load on the rollers and hold the oil pressure feature in reserve for use in case of trouble with the rollers.

The other three units will be equipped with thrust bearings of the Kingsbury type. This is a comparatively new form of thrust bearing which has shown very promising results under similar conditions. It is a babbitted bearing of novel design which requires a circulation of oil under atmospheric pressure only. It requires no auxiliaries, other than a gravity oil feed and has been successfully operated under loads as high as 900 lb. per sq. in. of bearing area. The coefficient of friction has been demonstrated to be lower than that of roller bearings under the same conditions. These bearings are interchangeable with the roller bearings and either type may be substituted for the other should one of them demonstrate any considerable superiority.

The thrust bearing, governor drive and main shaft coupling are enclosed in a housing having glass sight holes for inspection of the bearing and particularly for observing the oil supply. The interior of the housing is lighted by incandescent lamps.

Fig. 7—Method of Setting Lower Foundation Ring of Wheel Chamber

The Erection of Each Turbine

The weight on the thrust bearing is carried by a massive cast-iron support of conical shape which is in turn supported by the crown plate above the runner. The thrust bearing support has two diametrically opposite openings through which an operator can have access to the bearings and stuffing box of the main shaft. The crown plate, Fig. 3, is bolted to a heavy cast-iron foundation ring forming the upper lip of the passage which conveys the water to the runner. This foundation ring is securely connected by heavy forged steel separators to another similar ring which forms the lower lip of the passage to the runner. The upper foundation ring is riveted to a plate steel barrel which forms a lining for the wheel pit. This barrel is in turn riveted to a cast steel floor ring under the generator, thus constituting a continuous watertight lining for the wheel pit. The pit liner has a set of floor plates at the elevation of the thrust bearing and is provided with three entrances at this level. A ladder is used for access to the lower level. Both levels are electric lighted and arranged for adequate ventilation.

The erection of these pit liners is a matter of considerable interest on account of their extreme size and the accuracy with which it is necessary to set them up. The correct alignment of the crown plate and the thrust bearing which stands upon it depends of course upon the accuracy with which the upper foundation ring is set. In view of the difficulty and uncertainty attendant upon setting and holding this ring in place while the plate steel cylinder and floor ring are assembled and riveted to

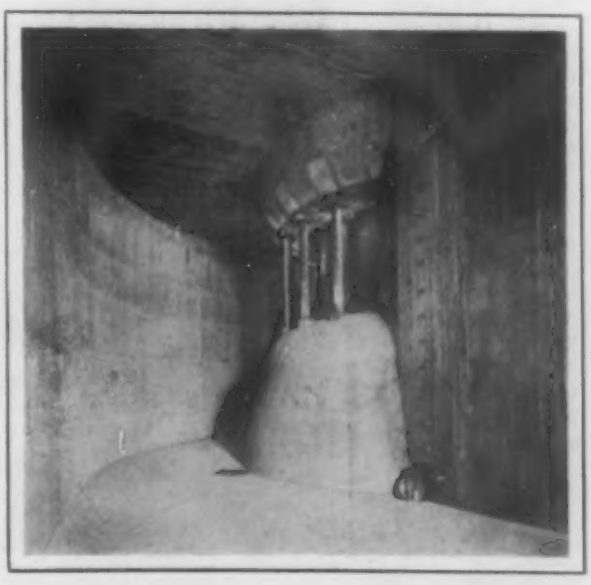


Fig. 8—View of Completed Wheel Chamber from Intake

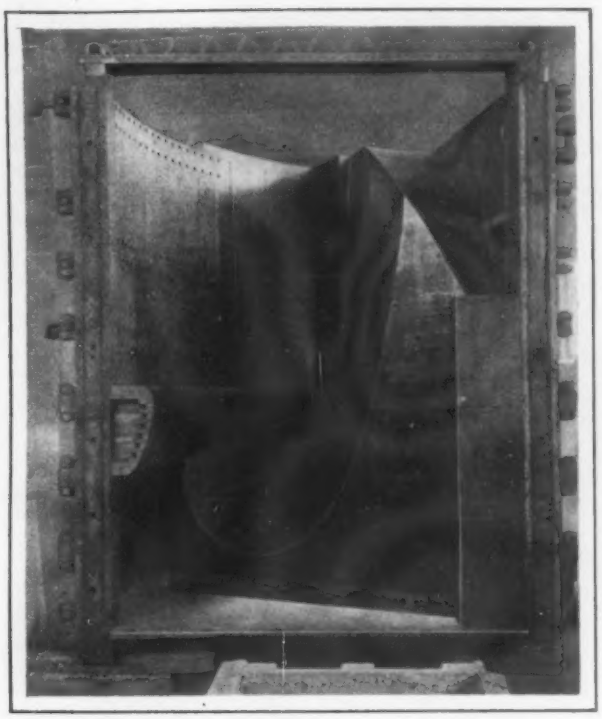


Fig. 9—Core Box for Turbine Runner with Front Removed

it and the concrete filled in around it, it was decided to leave an allowance for finishing in the field on all of the machined faces of the upper foundation ring which connect to the crown plate. This ring was the first part of the pit liner set up in the field and it was erected on temporary concrete piers built especially for the purpose. These piers are clearly shown in Fig. 4, which also shows a foundation ring set up on leveling wedges placed on top of the piers. The plate steel barrel is shown assembled in position on top of the ring ready for riveting.

The next stage in the erection was to fill in the concrete around the pit liner, leaving cored pockets at the separator bosses, shown in Fig. 5, which were filled up after the separators were in place. After this concrete had hardened for several months, the columns were removed as shown by Fig. 6, after which a temporary bulkhead was placed on the flange of the foundation ring which supports the crown plate and this bulkhead was loaded down with about 1,000,000 lb. of concrete blocks. This weight is somewhat in excess of the total load which will be carried by this ring when the wheel is in operation, consisting of the weight of the crown plate and thrust bearing support together with the weight of the rotating parts. Very careful observations were made to detect the amount of settlement due to this weight and it was found that it amounted to only a few thousandths of an inch and was practically negligible.

The next step in erection consisted of truing up the bore of the foundation ring, facing off the flange for the crown plate and the bosses for the separators. This was done by an electrically operated machine tool designed especially for the purpose. After this ring was trued up the separators were put in place and the lower foundation ring bolted to them. This operation is illustrated by Fig. 7. After the lower foundation ring was in place, the forms of the spiral wheel chamber were completed and the remaining concrete work was done. Fig. 8 shows a finished wheel chamber as viewed from the intake. This method of erection has worked out very satisfactorily and has resulted in an installation the accuracy of which is very unusual.

The Speed Controlling Apparatus

The governors for these wheels are as notable for their size as are the wheels themselves. They were built by the Lombard Governor Company, Ashland, Mass., and have a capacity of 250,000 ft.-lb. each. In designing these governors, it was found necessary to separate the parts of the control mechanism, installing the governor proper or actuator on the generator floor and the two regulating cylinders or servo-motors, together with the relay valve, on the thrust bearing gallery. On this gallery are also placed the accumulator and receiver tanks and the large triplex pumps which supply the pressure. These pumps are driven by individual three-phase induction motors manufactured by the General Electric Company and each is provided with an intermittent control system so that no energy will be used in pumping unless the tank pressure decreases to a certain predetermined minimum.

The controlling mechanism, which is contained in a massive cast iron actuator, is placed on the generator floor directly above the relay valve. This actuator contains the speed sensitive element together with all the anti-racing mechanism and the delicately balanced valves which control the movement of the large balanced relay valve on the floor below. Dials on the face of the actuator indicate the pressure existing in the tank system, the speed at which the unit is running and the position of the turbine gates.

Difficult One-Piece Casting of 140,000 Lb.

The total weight of each of the turbines is about 1,000,000 lb., and they are interesting in all their details, not only because of the novelty of the design, but also because of the extraordinary size of the various parts and the provisions necessary for their successful manufacture. In this respect the runner is the most interesting detail of all, particularly in view of the fact that the two manufacturers engaged on this work adopted two-radically different methods of making their runners. The runners made by the Wellman-Seaver-Morgan Company were cast and de-

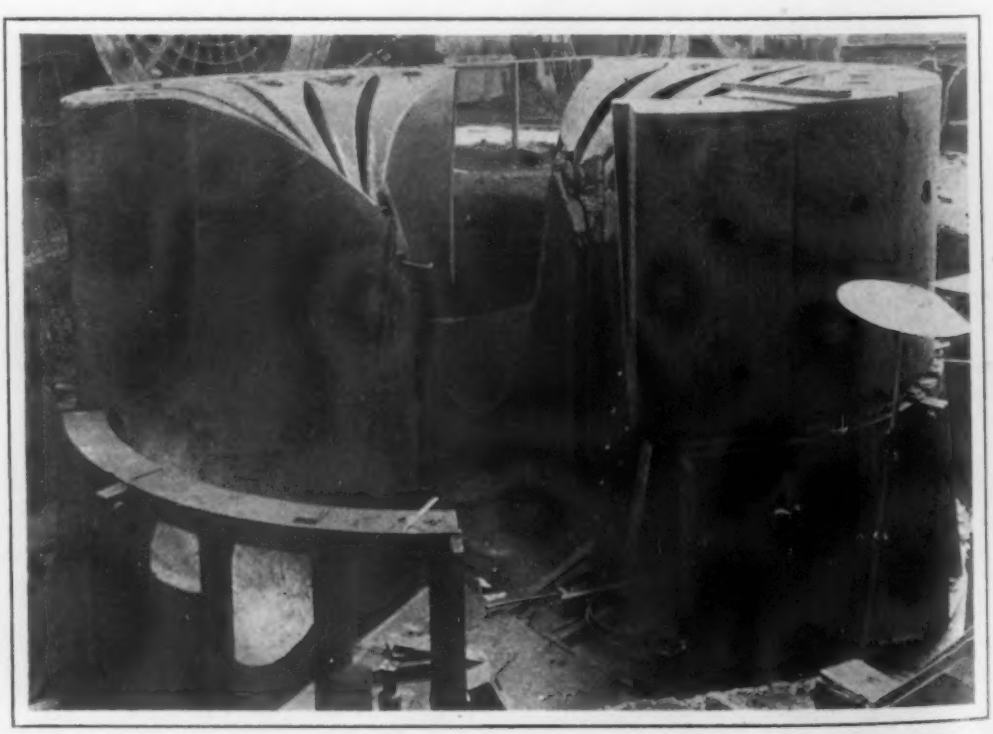


Fig. 10—Cores for Turbine Runner Set Up in Foundry

livered at the power house in one piece, whereas those made by the I. P. Morris Company were cast in quarters, each quarter being shipped separately and assembled in the power house. This method necessitated the use of a heavy cast steel cover plate on top of the cast iron sections of the runner and a heavy cast steel ring around the band, increasing the total weight of the wheel in place on the shaft by about 50,000 lb.

The runners made by the Wellman-Seaver-Morgan Company weigh about 140,000 lb. each in the rough, and about 130,000 lb. finished. The largest runners previously cast in one piece, either in this country or abroad, weighed about 35,000 lb. each. It is therefore evident that the making of the Keokuk runners was entirely without precedent and naturally involved many serious problems of construction as well as transportation.

Practically the entire mold for these runners consisted of cores. There were 16 main cores forming the vanes or buckets of the runner, each of these cores weighing about 20,000 lb. They were set up on cast iron plates in a pit 26 ft. in diameter and 11 ft. deep, having a concrete bottom. The mold projected about 9 ft. above the foundry floor, and the flask consisted of a tapering circular shell made of 1 in. steel plate. The tremendous uplift on the cope of this mold due to the pressure of the fluid metal was provided for by a grill work of 20-in. I-beams secured to the bottom plate under the cores by 32 rods 3 in. in diameter with turnbuckles. The casting was poured in about 4 min. The total weight on the setting-up plates after pouring, including the tension on the bolts holding down the cope was more than 1,000,000 lb. Three cupolas were used for melting. Up to the present writing no trouble has been experienced in the casting of any of the runners thus far made. Fig. 9 shows the core box for the main cores; Fig. 10 shows a set of cores partially assembled in the pit; Fig. 11 shows one of the castings in process of cleaning, and Fig. 12 shows one of the finished runners.

The runners are balanced by counterweights placed in an annular pocket on the top of the hub which is covered by a cast iron plate. The maximum balancing weight which it has been necessary to attach to any of the runners was 1075 lb., and the minimum 92 lb. The runners are bolted directly to a forged flange on the end of the shaft. No keys are used to transmit the torque.

Transportation of the Turbine Runners

The transportation of these runners from the Akron Works of the Wellman-Seaver-Morgan Company to the plant was as much of a problem in its way as the manufacture of the wheels themselves. It was undertaken by the Erie Railroad Company, in co-operation with the Elgin, Joliet & Eastern, the Chicago, Burlington & Quincy and the Toledo, Peoria & Western railroads, and a special car was built by the Erie for the purpose. The runner is probably the largest piece of freight ever handled by an American railroad. The minimum clearance around the cross-section of the load averaged about 2 in. at top, bottom and sides. The bottom of the wheel comes within 14 in. of the rail, and the top is 17 ft. 8 in. above the rail. The total width is 11 ft. 2½ in. Figs. 13 and 14 show a runner loaded on the cars.

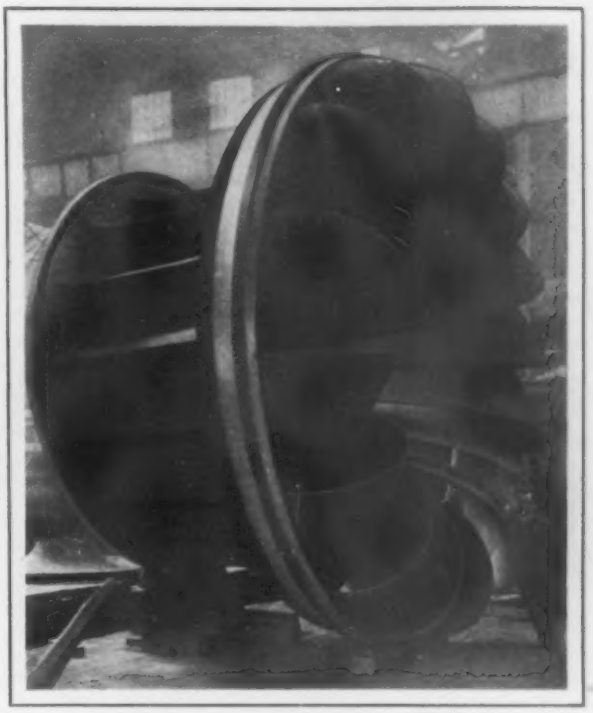


Fig. 12—Finished Runner for 10,000-hp. Turbine Made in One Piece

The first shipment was accompanied by a representative of the manufacturer and was received at the power house eight days from the time it left Akron. These shipments are delivered at Hamilton, Ill., and taken across the dam to the power house. The car is moved by daylight only under special instructions. Many changes along the route were required in order to secure the necessary clearances and the railroads deserve great credit for the skill with which they have surmounted the many obstacles encountered in handling these wheels.

Fig. 11—The 140,000-lb. Runner Casting in Process of Cleaning

The illustration at the head of this article shows the first half of the Keokuk power house practically completed. This photograph was taken on December 31, 1912. This part of the plant is now practically complete, except for the installation of the machinery. The foundations of the other half, and the draft tubes and intakes to the wheel chambers, are being completed at this time, but the superstructure will not be built nor the turbines installed until a later date. The view shown is taken from the

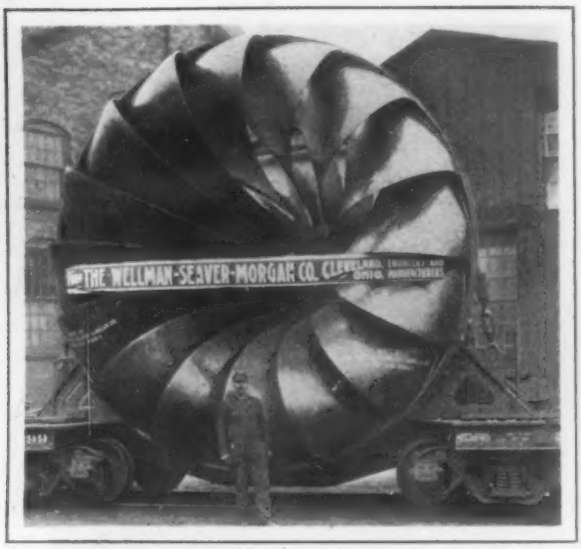


Fig. 13—Runner Loaded on Special Car

Fig. 14—Method of Supporting the Runner on Car

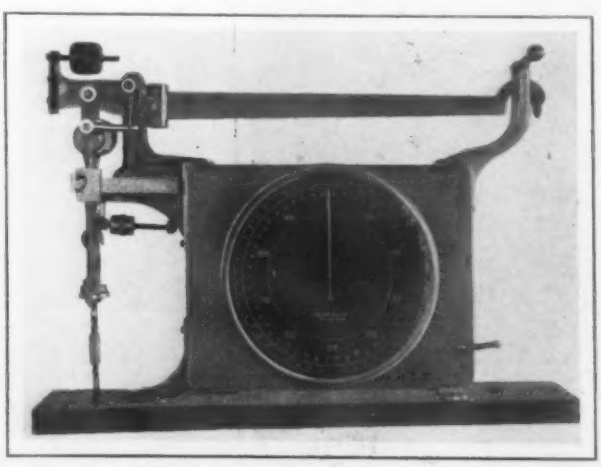
forebay side. The arches at the foot of the wall are the entrances to the wheel chambers.

With the exception of the superstructure of the power house and the electrical features of the installation, the entire development was designed and is being constructed under the supervision of Hugh L. Cooper, chief engineer of the Mississippi River Power Company. The power house superstructure above the generator floor, together with the transmission lines and substations, were designed and constructed under the supervision of the Stone & Webster Engineering Corporation. The plant is to be operated by the Stone & Webster Management Association.

A Quick Weight Indicating Device for Scales

A new device for quickly indicating the weight of any load that may be placed upon a scale has been developed by the McFarlane Mfg. Company, 1669 Selby avenue, St. Paul, Minn. Like some of the other devices now on the market this indicator is connected to the scale and incased in a glass dial. It performs the functions formerly done by the beam without the aid of springs. The use of this device is to secure speed and accuracy, which are the two special advantages claimed for the indicator. The weight of a load placed on the scale is given instantly, while with a scale beam time was required for its manipulation. As compared with the old method where the weigher was required to add up a mass of weights and to manipulate a poise back and forth to secure a balance it is emphasized that the reading of an indicator is not only simpler but tends toward accuracy.

This new device can be attached to a scale without discarding any portion of the original equipment, and if for any reason the indicator should become inoperative, it is simply released from the scale which can then be used as an ordinary beam scale. This feature also makes it possible to check the accuracy of the indicator as often as may be desired by reweighing the load on the beam, so that in reality two methods of weighing are secured. It is also possible to lock the weight so that it can be taken off after the load leaves the platform. The mechanical construction of this device puts the pull on pivots, an arrangement calculated to remove strain and wear from the working parts and insure long life.



A Device for Quickly Indicating the Weight of Any Load Placed Upon a Scale Made by the McFarlane Mfg. Company, St. Paul, Minn.

An Example of Motor Truck Performance

An interesting example of the money-saving feature of the motor truck is found in the experience of the American Car & Foundry Company, Chicago. The company has transportation that belongs to the heavy-duty long-haul class. In a year's operation of a 6½-ton Saurer truck on an exact cost accounting basis, the truck carried 14.1 tons per day a distance of 33 miles at an average cost, according to R. W. Hutchinson, Jr., of the International Motor Company, New York, of $6.45 per day. Adding to the per ton cost interest on the investment at 6 per cent. and all necessary motor vehicle insurance and an annual overhauling fund of $450, which fixed charges increase the per ton cost by 32.2 cents, the total cost per ton transported was 78 cents. With rented horse equipment the former cost was $2 to $2.50 per ton. In other words, the Saurer truck is saving the American Car & Foundry Company about $400 per month, which represents a return on the investment of 98 per cent., or is sufficient to pay for the truck in one year's service.

The third international congress on cooling is to be held in the United States in September. The delegates are to gather in New York on September 14 and journey to Washington, where on the following day will occur the official opening of the congress and the presentation of the foreign participants to the President of the United States. The main work of the congress is to be taken up in Chicago, September 17 to 24, and while the congress is in session there is to be an exposition devoted to insulating materials and the preservation of perishable foods. On September 23 there is to be an excursion to Milwaukee. Membership in the congress will require the payment of a fee of $4, except for members of the Association Internationale du Froid, who need to pay only $2. The secretary of the association is located at 9 avenue Carnot, Paris, France.

Reference was made in *The Iron Age* of February 27, page 568, to the Humboldt Engineering Works, Kalk, near Cologne, Germany, as having built the new flue-dust briquetting plant of the Krupp works at Reinhausen. The Ernst Wiener Company, 50 Church street, New York, is the Humboldt agent in America.

The Steel Corporation Dissolution Suit

James Gayley Disappoints the Government—Disproves Monopoly in Iron Ore

The hearings in the suit of the United States Government to dissolve the United States Steel Corporation were resumed in New York City February 28 with the examination of James Gayley, who was vice-president of the corporation from 1902 to November, 1908. Mr. Gayley stated that he is not now affiliated with the Steel Corporation or any of its subsidiaries but is a stockholder in the Steel Corporation. Jacob M. Dickinson, for the Government, questioned Mr. Gayley as to the iron ore ranges in the Lake Superior district, and he testified at length along technical lines as to the quantity and method of marketing ore in the Lake Superior district, and explained the controlling interests in various mines.

Going Back to the Rockefeller Operations in Ore Lands

Deals between the Rockefeller interests and the Carnegie and Federal Steel companies, respectively, which the Government contends resulted in the monopolization of the Mesaba ore lands and a division of territory between the three parties, were the subject of much of Mr. Gayley's examination. These transactions took place before the formation of the Steel Corporation, when the Carnegie and Federal companies were in sharp competition. They were introduced by the Government as showing the intent of later aggregation of ore lands by the Steel Corporation.

The evidence was brought out partly through the minutes of the Carnegie Steel Company for 1897, 1898 and 1899, and partly through the somewhat reluctant admissions of Mr. Gayley, who stated that before the formation of the Steel Corporation the three largest operators of Minnesota iron mines were the Minnesota Iron Company, controlled by the same group controlling the Federal Steel Company; the Lake Superior Consolidated Iron Mines, controlled by the Rockefeller interests, and the Oliver Iron Mining Company, controlled by the Carnegie Steel Company.

Competition in Acquiring Ore Mines

It developed that the Rockefeller enterprise came to an understanding with the Federal subsidiary by which they would not compete with each other further in acquiring ore lands. Mr. Gayley was quoted in the Carnegie minutes as referring to this as "the joint arangement." Unless certain purchases were made by the Oliver Company, the Rockefeller and Federal interests would be in a stronger position and the Carnegie Company would no longer hold the balance of power, Mr. Gayley had argued. "We will be at the mercy of the joint arrangement," he was recorded as saying.

The minutes also included a letter from Henry W. Oliver, president of the Oliver Iron Mining Company, in which he said the Federal people were making strong efforts to buy ore properties from "our landlords." Mr. Gayley explained that the "landlords" of the Oliver or Carnegie Company in respect to ore lands were the Rockefellers. The letter said: "I think it is an effort on the part of H. H. Rogers to induce Mr. Rockefeller to join with the Federal Steel Company to control the manufacture of steel the same as he does oil."

Mr. Dickinson, counsel for the Government, asked Mr. Gayley if the Carnegie Company, in making further acquisitions, had not been actuated by fear of the situation depicted by Mr. Oliver. He answered: "I can recall nothing about this particular letter, but, as a matter of fact, Mr. Oliver was continually parading scarecrows to induce us to buy more ore mines."

"But you did buy them?"

"Yes. But the general impression was that the Rockefeller scarecrow was not as black as it was painted."

Carnegie Company Violated Agreement with Rockefeller

In 1899, it appeared, the Rockefeller interests, which had agreed with the Federal Company to stop competing for ore lands, also made an arrangement with the Carnegie Company. It was in the form of an agreement between the Lake Superior Consolidated Iron Mines and the Oliver Iron Mining Company, arranged by a series of letters. The understanding was that the former would supply the latter with such additional holdings as it might require from time to time, and the Oliver Company would make no further purchases on its own account. In 1900, however, it did make additional purchases, and Mr. Gayley was called on the carpet by the Rev. Frederick T. Gates, who represented the Rockefellers in the ore business.

"Mr. Gates demanded," said Mr. Gayley, "that Mr. Oliver should turn over to his company the 75,000,000 tons of ore he had bought. We contended that the Rockefellers had not supplied us with all the ore lands we needed as they had agreed to do. Mr. Gates declared we had no right under the agreement to make this purchase."

"Whose contention prevailed?" asked Mr. Dickinson. Mr. Gayley avoided a direct answer to the question for a time, but on being pressed said:

"We did turn the properties over to the Rockefeller Company, and it might be inferred from that that we admitted that Mr. Gates was right, but we did so with the contemporaneous understanding that he would lease back to us not only these holdings but many additional properties."

All three of the mining companies, as well as the Carnegie and Federal Steel companies, were afterward acquired by the Steel Corporation.

More on Ore Matters Prior to Corporation's Day

After the passage of several days, Mr. Gayley's examination was resumed March 5. It was the subject of general remark that he was not anxious to testify, volunteering no information but merely answering direct questions. After Mr. Dickinson had read numerous entries from the minutes of the Carnegie Steel Company which reported what "Mr. Gayley" said, the witness was willing to assume that there was some sort of a contract entered into about June 6, 1900, between the Federal Steel Company, owning the Duluth & Iron Range Railroad, on the Vermillion Range, and the Carnegie Steel Company, whereby the latter was to get whatever rebate there was between 60c. freight on ore from the Ely district to the lake dock and the rate the outsiders would have to pay, presumably $1 per ton. He was emphatic in declaring that he did not know whether the Carnegie Company ever collected one dollar under the contract. There was some mention about $200,000 being due the company on the business. While this only affected a limited tonnage of ore, as compared with that produced elsewhere in the Lake Superior region, the testimony was brought out by the Government to show a community of interest which amounted to a division of territory.

George W. Murray, personal counsel to John D. Rockefeller, appeared the same day in response to a subpoena directed to Mr. Rockefeller and calling for the production of a number of papers. Mr. Murray produced all of these that could be found on Mr. Rockefeller's files. They consisted of letters and agreements relating to various Lake Superior ore properties. Among them was a letter to Mr. Rockefeller and J. P. Morgan & Co. from Henry C. Frick and others, dated March 18, 1901, by which was consummated the sale of the Rockefeller ore holdings to the Steel Corporation. The Carnegie and Federal Steel companies, with their ore subsidiaries, went into the Steel Corporation at its organization. The Duluth & Iron Range Railroad went with the Federal Steel Company and the Duluth, Missabe & Northern, the other railroad reaching the Minnesota ore districts, was acquired with the Lake Superior Consolidated Iron Mines sold by Mr. Rockefeller.

High Ore Prices Encouraged by Carnegie Company

At the hearing March 6 Mr. Gayley admitted that as an official of the Carnegie Company, he "kept in touch" with the Bessemer Ore Association, at Cleveland, to encourage higher ore prices, although he would not admit that the

purpose of the Ore Association was to fix prices. This association had been in operation years before the formation of the corporation. It was to the interest of the Carnegie Company that ore should be kept as high as possible. He said the ore dealers in 1899 all agreed to advance the price $2 a ton. In 1900, according to the minutes of the Carnegie Company, Mr. Gayley presented to the Ore Association a proposition not to sell "their surplus ore, to which they seemed disposed favorably," adding, "I don't recall that it got beyond the talking stage."

He attended two meetings of the Ore Association after the Steel Corporation was organized and had frequently been consulted by the association by letter and telephone. His influence was exerted toward keeping up the price of ore. If the dealers in ore reduced the price, he said, pig iron would come down and so would the price of steel products. In 1904 the members of the association were disturbed about conditions in the iron trade and wanted to reduce prices. Regarding this Mr. Gayley said:

"I was always informed regarding the ore situation. I attended these meetings to discuss with them a proposition advanced by the association that the Steel Corporation buy 1,250,000 tons of ore from merchant mining companies. The Bessemer Ore Association was greatly exercised over the ore situation and thought that this sale to the Steel Corporation would help to bolster up conditions. The corporation, however, refused to hold its bag open to the extent of 1,250,000 tons."

"What else transpired at these meetings?"

"We talked over the situation. The ore people were in a very depressed and pessimistic state of mind and wanted counsel as to what action to take."

"Did you advise them?"

"Yes, I counseled them not to reduce the price then prevailing, which, I believe, was above $5. My idea was that my optimism and their pessimism would bring about a sort of compromise, resulting in the establishment of a fair price, say $4 or $4.50."

"What did actually result?"

"They cut the prevailing price in half, if I remember correctly. Corrigan, McKinney & Co., in fact, announced that they would take business at whatever price they felt like quoting. The situation was entirely disorganized and nothing like it had been seen in ore circles in 10 years previous."

Mr. Gayley testified that he advocated the purchase of the Champion iron mine by the Steel Corporation in 1902, and George W. Perkins and E. C. Converse were present at the meeting at which this recommendation was made. Counsel for the Government drew out the admission that the Union-Sharon Steel Company, subsequently acquired by the corporation, was after the property at the time.

Some Inquiry Into Carnegie Affairs

Plans of the Carnegie Steel Company, for extending its business into the fields of competitors were gone into. The Government contends that it was the threat of the company to build a great tube plant at Conneaut that led the other manufacturers to combine and buy the Carnegie interests at an inflated price. A discussion was read from the minutes of the company concerning an appropriation of $1,400,000 for the erection of a steel wire plant at Conneaut, which would have threatened the business of the American Steel & Wire Company. Mr. Gayley, who attended some meetings of the board as an alternate, remembered that the appropriation was made, but said not a dollar of it was ever expended. He added: "Mr. Carnegie was strongly in favor at that time of building the plant, but later in the year he changed his mind about it and it was dropped."

Mr. Gayley was next asked about an agreement between the Carnegie, Cambria, Bethlehem and Illinois Steel companies in 1898 for pooling the business in steel rails, but he explained that this was a branch of the business with which he had nothing to do and his mind was on the ore business, of which he had entire charge, so that he did not retain in his memory any details of reports regarding rails made when he was a substitute director. He had heard at these meetings, however, that the rail agreements extended from 1898 to 1900 inclusive, which was the period just before the formation of the Steel Corporation.

Asked if the Carnegie Company had not been disturbed by the absorption of the Lorain Steel Company by the Illinois Steel Company, Mr. Gayley said he d[illegible] think it was and Mr. Dickinson showed him the minutes containing a letter from Andrew Carnegie saying that the situation resulting from this consolidation was regrettable. "I can't say," commented Mr. Gayley, "what Mr. Carnegie may have had in his mind at that time."

Cross Examination Elicits Interesting Points

Mr. Gayley was cross-examined March 7 by C. A. Severance, of counsel for the Steel Corporation, and gave strong testimony for the defense.

Mr. Severance first brought out that the desire and efforts of the Carnegie Company to keep up prices of ore and of pig iron, to which Mr. Gayley had testified, were shared by all the other steel manufacturers, as high prices for raw material meant high prices for products. If a manufacturer had laid in a considerable supply of raw material, Mr. Gayley explained, he objected to a cut in prices, because it depreciated the value of his supply, and with the lower prices he would make on his products, it represented a loss. However, even this view of Mr. Gayley's was not shared by his chief associates in the Steel Corporation. At a meeting of the directors in 1903, he said, Judge Gary opposed a proposal for buying pig iron in order to keep up prices and it was decided to buy only such amount as was actually needed from time to time.

Explains the Violated Rockefeller-Carnegie Agreement

The contract made by the Oliver Iron Mining Company, the ore subsidiary of the Carnegie Steel Company, with the Rockefellers in 1896 by which it agreed to obtain its ore lands only from them, which the Government had exploited as part of a conspiracy to monopolize ore, was taken up. Mr. Severance asked how the Oliver Company came to go into the market for ore lands after making its agreement with the Rockefellers. Mr. Gayley explained:

"We had been working a mine for some years and the tonnage that we had taken out meant that we had to work at an increasing depth. Contiguous to this mine were extensions of the same body of ore, which were owned by the Rockefellers. They had agreed to furnish us with such lands as we needed, and we wanted to buy these in order to broaden our operations so that we could work the mine we had to better advantage. We asked them to sell, but they were very indifferent, so we bought some lands from other parties as a means of self-protection.

"When Mr. Oliver and I went to see Rev. F. T. Gates, the Rockefeller ore representative, he first demanded that we turn our purchases over to him without conditions, which we refused to do. He then asked that we turn them over technically on his agreement to return them to us and also to lease to us the contiguous deposits we wanted on our agreement to ship the ore over his road. This was done."

The rebate agreement by which the Federal Company carried ore for the Carnegie Company over the Duluth & Iron Range Railroad for 60c. instead of $1 a ton was inquired into. The impression had been left that independent operators were the sufferers by this arrangement. Mr. Severance brought out that the subsidiaries of the two companies were the only interests engaged at that time in getting out ore in the district affected, and there were no other shippers. Mr. Gayley also testified that the freight rates on ore of the same character from Michigan and Wisconsin ranges were only from 32c. to 40c., as against the competing ore carried at 60c.

Corporation Turned Down Proposed Ore Land Purchases

Mr. Severance took up a number of specific ore land purchases that had been recommended by Mr. Gayley and rejected by the Steel Corporation, much to Mr. Gayley's dissatisfaction and also to the displeasure of Thomas F. Cole, president of the Oliver Iron Mining Company. He testified that he was strongly in favor of the acquisition of additional ore lands by the Steel Corporation, but "the idea of a monopoly never entered his head." He never heard that phase of the subject mentioned by the directors, who, in most cases, refused to carry out his recommendations for more purchases. He said:

"I always believed that we should have at all times a supply of ore in sight for the next 50 years. As our needs increased, we should keep up this future supply by buying each year at least as much ore as we consumed. This I re-

garded as necessary to the protection of our business. It was not safe to have less than 50 years' supply when you consider the amount of capital put into steel works."

"What success did you have in impressing these views on the executive committee?" asked Mr. Severance.

"I had no success," replied Mr. Gayley. "The Steel Corporation never had at any time more than 30 to 35 years' supply."

On direct examination Mr. Gayley had told of recommending to Henry C. Frick the purchase by the Steel Corporation of the Tennessee Coal & Iron property a year before it was absorbed in the panic of 1907, and this was regarded by the Government attorneys as showing that the Steel Corporation merely awaited a good opportunity to control the Southern field, but it lost much of its effect when Mr. Gayley told how he had suggested many other purchases, which, like that of the Tennessee Company, were not made.

Plenty of Ore Properties Still Available

Mr. Gayley was asked what ore deposits were available if a new steel company should go into business on a large scale. He answered:

"If it were on the Atlantic seaboard it would have deposits in northern New York to draw from for one source. There are large deposits in the Adirondacks that have only been scratched. There are others in Nova Scotia, with cheap water transportation. There is more ore in Cuba than in the entire Minnesota district. Deposits in Brazil are enormous. Estimates by engineers are so large as to be astounding, running to 1,000,000,000 tons, if not more. The Bethlehem Steel Company is already getting ore from Sweden."

"Suppose the new company located on the Great Lakes?" suggested Mr. Severance.

"It could get plenty of ore from the western Mesaba, from the Baraboo district in Wisconsin and from the Witherbee-Sherman mines in northern New York. The quality of the New York ore is the finest in the world and the quantity is enormous. This deposit is just beginning to be worked. In Utah there are deposits of from 300,000,000 to 500,000,000 tons, with coking coal easily accessible. Limestone, the other factor in making pig iron, is found everywhere, and Utah is so situated as to be able to support a self-contained steel industry. On the Pacific there are large deposits in Lower California, and when the Panama Canal is opened cheap coal will be available. In Texas there are rich deposits to support a steel industry there, with coal economically available from Alabama."

"Do you know of any other commercial reason why these deposits are not developed?"

"Simply a lack of consumption of steel in sufficient quantities in the West and Southwest, so that the demand can be more economically supplied from the present plants."

His Opinion of the Tennessee Company

Mr. Gayley continued his testimony March 10, still under cross-examination. He said that his suggestion in 1906 to Mr. Frick to buy the Tennessee Coal & Iron property was made when he happened to meet him in the corridor of the Empire Building. An examination of the Tennessee property had just been made by engineers, preliminary to a projected merger with the Republic Iron & Steel Company and the Sloss-Sheffield Company, which was never consummated. Mr. Gayley, who was always trying to get the Steel Corporation to buy more ore lands, with little success, told Mr. Frick that the examination had developed great bodies of ore, and that the Steel Corporation ought to buy the property. Mr. Frick, he said, replied that the property could not be bought at a price that would justify the purchase.

This, said Mr. Gayley, was the only discussion he had as to the property until the question of its purchase came up during the panic. Then Judge Gary asked him what he thought could be counted on as the ore reserves of the Tennessee Company. He said he had entire confidence in the report that had been made, and gave Judge Gary the substance of it.

As to the Hill ore leases, Mr. Gayley said the price paid by the Steel Corporation was high, but it needed the reserves. The acquisition of the Union and Sharon Steel companies was touched on, and Mr. Gayley said he had heard no talk about suppressing competition in connection with it.

Direct Examination Resumed, Going Back to 1900

Mr. Dickinson asked Mr. Gayley, who was an officer of the Carnegie Steel Company in 1900, how the Conneaut project came to be dropped. All Mr. Gayley knew about it was that Mr. Carnegie changed his mind after $1,400,000 had been appropriated for the purpose. The project was laid on the table at a meeting before the Steel Corporation was launched.

Mr. Dickinson read from the Carnegie minutes of November 6, 1900, quoting Charles M. Schwab as saying that J. P. Morgan had sent for him. Mr. Schwab didn't go because he thought the financier wanted to talk about railroads, but later on he saw Charles Steele, J. P. Morgan's chief assistant, and learned from him that the banker was much alarmed at the talk about a new tube plant for the Carnegie Company, and the prospect of a rival million dollar plant was not encouraging. Mr. Steele told Mr. Schwab, according to the minutes, that J. P. Morgan wanted "a definite announcement of our intention." It was not long after this that the Conneaut plan was dropped.

The Government put in documentary evidence to show that H. C. Frick owned 37,100 shares in the Cambria Steel Company, which is independent of the Steel Corporation, the implication being that he represented a community of interest between the corporation and the independent company.

In Honor of Frank Baackes

Frank Baackes, vice-president and general sales agent of the American Steel & Wire Company, attained his fiftieth birthday anniversary March 9 and a dinner was tendered him on Saturday evening March 8, at the Chicago Athletic Association by friends who have been intimately associated with him in the various periods of his business life, including a number of the officials of the American Steel & Wire Company and Illinois Steel Company at Chicago. To those present the occasion was much more than one of business courtesy, being rather the expression of many years of close friendship. As an additional token of the affection in which he is held Mr. Baackes was presented with a silver and gold loving cup, the presentation being made by D. A. Merriman, the toastmaster of the occasion. Reminiscences and personal tributes were the topics of those who spoke, among whom were Thomas H. Taylor, George A. Cragin, J. R. Thomas, George F. Rummel, Ernst Boley, H. G. Baldwin, George Baker, C. S. Knight, F. C. Ayers and L. C. Munoz. The beautifully designed and embossed menu card bore an excellent likeness of Mr. Baackes and the signatures of the friends in attendance. In addition to the above those present were J. S. Keefe, H. S. Doyle, Frank Baackes, Jr., A. W. Sprague, M. Dreyfus, R. S. White, F. C. Gedge, S. Deutsch, Walter Stowe, A. F. Allen, J. W. Meaker, Jr., O. B. Barrows, F. L. Watson, James Burry, W. O. Davis, F. D. Day, Royal Mattice, W. H. Foge, W. J. Totten, E. S. Humphrey, H. D. Thompson, Lewis Johnson, C. A. Vogt, A. T. Merriman, George C. Furst, G. D. Baackes, Karl Baackes, L. C. Munoz, Jr., P. W. O'Brien, M. Whaling, B. B. Ayers, N. R. McLeod, Charles Lutz, C. S. Knight, Jr., A. E. Atherton, A. T. Weaver, J. P. Tufts.

Testing Material Information

Interesting information on testing materials was given in a brief paper read by H. W. Hayward, associate professor of applied mechanics in the Massachusetts Institute of Technology, in Boston, December 20, at a meeting of the Boston section of the American Society of Mechanical Engineers. Ductile material elongates when twisted, he said, and he emphasized that the modulus of elasticity of a piece of high carbon steel is the same as for soft carbon steel, within the elastic limit. A crystalline fracture can be obtained on soft rivet steel by gradual tension. Fiber rope can be made to break in the center if held by eye splices, properly made and wet. Steel or copper cable can be broken if held in cast sockets. Finally, he mentioned that best rivet steel can be nicked and bent without cracking open.

ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the

David Williams Company

239 West 39th Street New York

W. H. Taylor - *President and Treasurer*
I. A. Mekeel - - - *First Vice-President*
Fritz J. Frank - - - - - *Secretary*
M. C. Robbins - - - *General Manager*

Editors

Geo. W. Cope A. I. Findley W. W. Macon

Charles S. Baur - - *Advertising Manager*

Branch Offices

Chicago: Otis Building Philadelphia: Real Estate Trust Bldg.
Pittsburgh: Park Building Cleveland: American Trust Building
Boston: Compton Building Cincinnati: Mercantile Library Bldg.

Entered at the New York Post Office as Second-class Mail Matter

Subscription price: United States and Mexico, $5.00 per year; to Canada, $7.50 per year; to other foreign countries, $10.00 per year.

CONTENTS.

Plant for Making Automobile Tool Boxes..... 643
A Natural Draft Cooling Tower..... 646
Lake Superior Iron Ore Shipments in 1912..... 647
New Open-Hearth Furnace Designs..... 648
Cooling Device for Open-Hearth Steel Furnaces..... 649
Conference on the Development of Uses for Electricity..... 649
Early Increase in Steel Capacity..... 650
Railway Steel Spring Company's Year..... 650
The Newark Foundrymen's Association 651
The Philadelphia Foundrymen's Association..... 651
The American Steel Foundries' Year 651
The Definition of a Machine Tool..... 652
Private Car Investigation 653
Motor-Driven Lever-Feed Disk Grinding Machine..... 653
Factors in the Valuation of Iron Mines..... 654
Gas Producers for Small Heating Furnaces..... 657
A New Portable Steel Hoist for Machine Shops..... 657
Standard Sanitary Mfg. Company Changes..... 657
Large Direct-Current Generators..... 658
The Turbines of the Keokuk Power Plant..... 659
A Quick Weight Indicating Device for Scales 664
An Example of Motor Truck Performance 664
The Steel Corporation Dissolution Suit 665
In Honor of Frank Baackes..... 667
Testing Material Information 667
New Cabinet Departments 668
Prolonging the Life of the Converter..... 669
Our Effective Blast Furnace Capacity..... 669
Abolishing Pictures in Factories..... 670
Correspondence 671
Further Decline in Steel Corporation Orders..... 671
Iron and Metal Markets..... 672
Personal 684
Obituary 684
Pittsburgh and Vicinity Business Notes..... 685
The Pittsburgh Foundrymen's Association 686
Republic Company Iron Mines..... 687
Large Manganese Bronze Castings..... 687
Blast Furnace Improvements 687
Compensation in Wisconsin Covers No Damages..... 687
Aids to Scientific Foundry Management..... 688
The Hoover Steel Ball Company..... 689
The Lash Process on the Pacific Coast..... 689
Metal Trades Annual Meetings..... 690
General Electric Equipment for Steel Plants..... 690
The New Ways and Means Committee..... 691
The Leetonia Steel Company 691
February Copper Production and Stock..... 691
The Machinery Markets 692
Trade Publications 700

New Cabinet Departments

Hail to the Department of Labor! Neglected from the foundation of the Republic, the great and sacred cause of Labor is hereafter to have its advocate, defender and perhaps apologist, sitting in the President's Cabinet. Heretofore every man who has had a place in the Cabinet has been unable to sympathize as he should with the aspirations of Labor. All of them have been guiltless of ever having had to win their bread by the sweat of their face or to earn their board by soiling their hands. This Government has been run by silk stockings, born in luxury, reared out of contact with the common people, educated by private tutors and trained to scorn the man who toils. We have had as rulers no farmers' sons who spent their youth with plow or hoe from daylight to dark, nor sons of mechanics who trod in their fathers' footsteps, nor men who worked their way from other humble beginnings to become leaders in finance or commerce or industry. Not until this glorious year 1913 have we had a man in the Cabinet who actually did a stroke of work or belonged to a union. Now we have one who has qualified himself to enter thoroughly and enthusiastically upon the great task of educating this idle, listless and slothful nation to appreciate the advantages to be realized from having walking delegates in every occupation, from reducing hours of work to none as nearly as possible, and from raising wages steadily as long as employers have any margin of profit whatever. If Congress should continue to favor the cause of Labor by exempting unions from every liability to prosecution or even to legal proceedings of any kind, it will be most admirable to have a representative in the Cabinet who can get the ear of the President and persuade him to give his assent to the proceedings.

Of course it may be somewhat awkward if an emergency should arise such as that which confronted President Cleveland in 1897. The Debs Labor riots in Chicago would have been attended with much loss of life and far more destruction to property but for the action of that union-ignoring Executive who quelled the disturbance by the mere assemblage there of Federal troops, that were not obliged to fire a shot. But at that time Labor had no representative in the Cabinet to plead its cause and induce the President to keep his hands off while Labor burned the city. It is to be hoped that President Wilson may be favored with peaceful conditions during his administration and that no serious Labor outbreak may occur in any of our great cities that would cause him to take action distressing to his Labor adviser.

The recognition of special interests in the Cabinet, emphasized by this new portfolio, brings up the question whether there is not an omission that should be rectified. It would seem as if there should be a Department of Thrift, with a secretary to represent the interests of those who are so constituted that they cannot help saving money and thus become able to employ others or to furnish means to those who are ambitious to do things but need capital. There was a time when such people as these were considered substantial and even respectable citizens, not only worth having in any community, but actually regarded with pride by their fellow citizens, especially when they gave employment to many people or were ready to support liberally meritorious projects for local improvements. But for some years the thrifty class has been in disrepute. Evidences of accumulated savings have been assumed to be indica-

tions of wrongdoing. Nearly every Cabinet officer has in his department some bureau charged with the duty of pursuing the men of thrift and making life as uncomfortable as possible for them. Discouragement of thrift, although under another designation, has become a popular pursuit, and the Congressman who boasts that he is not rich enough to buy a cow leads in the attempt to dissipate the fruits of those who have saved and therefore have accumulated. If we are to have Cabinet portfolios to represent special interests, let us by all means have a Department of Thrift.

Prolonging the Life of the Converter

In some recent references to the supplanting of Bessemer steel by open-hearth steel perhaps too much has been predicated on the preference shown by the railroads for open-hearth rails. It is to be considered that the revolution in the rail trade that made the open-hearth product last year nearly 200 per cent. of the Bessemer (2,105,144 tons and 1,099,926 tons), whereas six years before it was only 5 per cent. of the Bessemer (186,413 tons and 3,791,459 tons) has been almost entirely a matter of phosphorus and carbon content. In what may have been an unwarranted confidence in low phosphorus as a safeguard against breakages, and an over-reliance upon the higher carbon permissible in the open-hearth rail, to give longer wear, the railroads have paid the $2 premium for open-hearth steel at a time when other open-hearth products were bringing much less than 1.34 cents per pound. This precipitate demand for open-hearth rails has come, even though the open-hearth furnace has given no more guarantee than the converter against the ingot defects that are now of first consequence in the whole big problem of the rail. Therefore, the present ratio of Bessemer and open-hearth rail steel is not to be accepted as final.

More significant than the fact that the great superiority imputed to the open-hearth rail has yet to be demonstrated is the relatively smaller falling off in the use of Bessemer steel in other lines than rails. For sheets, tin plates, wire and wrought pipe, Bessemer steel has advantages in working that will insure its continued use in a large way, while the amount of Bessemer steel marketed as bars was probably greater in 1912 than in any year preceding.

It is to be considered also that the duplex process represented a larger use than ever of the Bessemer converter last year, though the statistics credit all such steel to the open-hearth furnace as the place of final refining.

The suggestion that the electric furnace will also add to the life of the converter, has been consistently championed in some quarters and is well entitled to consideration. In the fact that the electric process maintains a reducing slag and thus insures the elimination of oxides are large possibilities of its use for the manufacture of high quality steels, principally rail steel. There is a growing belief that, particularly for service in higher latitudes, electric steel will be the final resort of the railroads, even at a considerable advance over the present cost of open-hearth rails. Assuming that cost can be reduced appreciably below the present charge for electric rails, which will be a matter of time, there is little doubt of an important development of the combination of converter and electric furnace. It is not to be overlooked, however, that rails have been a steadily dwindling fraction of our total steel output and that the converter will long be likely to find its largest use in the Bessemer-open-hearth duplex process and in the direct production of steel for the bar, sheet, wire, pipe and tin plate trades.

Our Effective Blast Furnace Capacity

It is a matter of common knowledge that the steel works of the United States have been operating at practically their full capacity for a number of months, and also that there is a considerable proportion of idle merchant blast furnace capacity. In these circumstances it is desirable to look afresh into that ever recurring question, "What is our pig-iron capacity?" It has been aptly remarked that when our production is small statements of our possible capacity are usually large, but that when the industry is very active it is shown that such estimates must be toned down. Our capacity then appears small. This divergence occurs because there are many blast furnaces which can operate only under exceptionally good conditions. When times are bad there is no definite means of drawing the line, for nearly every furnace is a possible candidate. When times are good, on the other hand, the question can properly be asked: "If this furnace can make pig-iron, why doesn't it?"

It is no new thing to have in physical existence furnaces which are commercially dead. This has been the rule as long as there have been blast furnaces. To cite one instance, the year 1890 was one in which blast furnaces would be operative if they had any chance at all, for the year's actual output broke all previous records by 21 per cent., and it was not until five years later that this new record was surpassed. The average price of pig-iron in 1890 was higher than the average of the two preceding years, and higher than any price reached until nine years later. Furnaces in physical existence in 1890 but which did not produce were therefore not in commercial existence. We find, however, that the maximum rate of production in 1890, as shown by our monthly blast furnace reports at the time, was 183,846 gross tons weekly, or at the rate of 9,560,000 gross tons per annum, this being on December 1, while the year's production as officially reported was 9,202,703 gross tons. Nevertheless, Swank's Directory of 1890 showed, for November 1, 1889, a capacity of blast furnaces then completed and presumably effective of 11,757,000 gross tons, with 27 furnaces being built, some of these having doubtless been completed and having contributed to the 1890 production. Mr. Swank presented a list of considerably more than 100 furnaces, not included in this summary, a few of which were definitely marked abandoned, the majority being simply "long inactive." In the retrospect, it was obvious that practically all the furnaces commercially effective in 1890 contributed to the year's output, but the apparently effective furnaces, excluding abandoned furnaces, furnaces long inactive and furnaces being built November 1, 1889, showed an apparent capacity 23 per cent. greater than the maximum rate indicated by our blast furnace report as having been reached, and 28 per cent. in excess of the full year's output.

In view of this and other instances which could be cited, one becomes disposed to base an estimate of our effective blast furnace capacity, not upon lists of ratings, but upon actual performance, plus as close an

estimate as can be made for the idle furnaces. The nearer the industry is running to capacity, the less is left to be estimated; hence the present is a particularly favorable time for making an estimate.

That the steel interests have reached practically their maximum pig-iron output is proved by comparing their outputs in recent months with the commercial conditions which have been known to exist. Since May of last year the pressure upon steel works for deliveries has very greatly increased, yet their output has increased very little, as shown by the first column of the subjoined table:

Daily Rate of Pig-Iron Production for Ten Months—Gross Tons

	Steel Works.	Merchant.	Total.
May, 1912	62,018	19,033	81,051
June	60,799	20,559	81,358
July	58,168	19,570	77,738
August	59,464	21,582	81,046
September	59,102	23,026	82,128
October	62,820	23,952	86,772
November	62,817	24,878	87,695
December	63,770	25,996	89,766
January, 1913	63,921	26,251	90,172
February	64,005	28,364	92,369

The steel works were limbering up during the first half of 1912, and therefore made their maximum output in May rather than in March, as is customary under unchanged commercial conditions. Warm weather naturally cut down their product thereafter, and it was not until October, another physically favorable month, that the May rate was exceeded. From October to February, four months, the steel works rate increased only from 62,820 to 64,005 tons a day, or 1.89 per cent. Doubtless the increase in capacity in blast was greater, for October was a favorable month and February an unfavorable month for production; but for a year's average it would not be fair to take an exceptionally favorable month as the basis, and it seems perfectly fair to conclude that about 65,000 tons a day represents the effective commercial capacity of the blast furnaces of the steel interests. This is 23,725,000 tons a year.

The merchant furnace statistics of the past few months have told an entirely different tale from the steel works furnace statistics. From May, 1912, to February, 1913, the merchant furnace output increased 49 per cent., and from October to February it increased 17 per cent., when the steel works increased less than 2 per cent. Evidently quite a number of merchant furnaces were near the dividing line of cost equal to selling price and the merchant furnace capacity commercially effective in conditions not far from those recently ruling ought to be taken at considerably greater than the actual production rate recently achieved.

The course of the market recently has not been such as to fix a definite line between the commercially fit and the commercially unfit furnaces. It has been winter, so that a season's supply of Lake Superior ore could not be figured upon. There was a virtual famine in coke, culminating in December, while the market has since broken. Since late in December the tendency of pig-iron prices has been downward, and the market has been decidedly dull. The owner of an idle furnace has therefore had no definite data upon which he could figure whether it would be profitable to blow in his furnace.

There might be many merchant furnaces, any one or half dozen of which could blow in and make a profit, or avoid losses, at present relative prices of ore, coke and pig-iron. There are, indeed, nearly 100 coke and anthracite merchant furnaces now idle, with a capacity running into millions of tons annually, but were it the case—which it is not—that every one of them could individually figure upon making a profit by blowing in, it is quite certain that no large number of them could blow in without depressing the pig-iron market or advancing the coke and ore markets to such an extent as entirely to disturb the present relation. Furthermore, it would be difficult to secure a labor supply for any considerable number of these idle furnaces.

At the present spread between the materials and labor which the furnaceman must buy and the prices he can realize for his pig-iron, there is probably less than a million tons of commercial capacity now idle among the merchant furnaces; certainly the amount is much less than 2,000,000 tons. This is really the only item that requires estimating.

The remaining items can be computed with considerable accuracy. We have found 23,725,000 tons of annual capacity as probably the outside for the steel works furnaces. The merchant furnaces, coke and anthracite, actually made pig-iron during February at the rate of 10,350,000 tons. The charcoal furnaces can be placed at about 350,000 tons. These three items give us 34,420,000 tons. It is even conceivable that a continuance of present conditions would force the blowing out of some stacks now in operation, merchant furnaces through commercial conditions, or steel works furnaces through their being unable to maintain the pace of the past six months, for it is doubtful whether at present the average proportion of steel works furnaces are out for repairs. Then our actual capacity, under present conditions, would be found to be 34,000,000 tons, or even slightly less. Making a moderate allowance for merchant furnaces now idle, the capacity would come out at about 35,000,000 tons, while it would require an extreme allowance to show as much as 36,000,000 tons. As to furnaces now being built, there are few, and the work is relatively slow, so that new furnaces constitute an almost negligible item in considering the next 10 or 12 months.

A safe working rule, therefore, would probably be that it is doubtful whether, under a continuance of present pig-iron prices, and a continuance of the present prices and supplies of labor and materials, the United States can make as much as 35,000,000 tons of pig-iron in the next 12 months even under the assumption that some furnaces operate at the cost line.

While a considerable improvement in market conditions might raise this limit materially, there is good reason to believe that if in the future the country offers to pay higher prices for increased output the increased production will occur through the projecting and building of new furnaces rather than through the resuscitation of the majority of the furnaces now idle but carried in the lists as possibilities.

Abolishing Pictures in Factories

At a large manufacturing plant it is a rule that no advertising or other illustrated matter shall be posted anywhere in the works. Even the calendars issued by commercial houses are forbidden; but instead the company furnishes calendars bearing the name of the shops. The practice of ornamenting walls, benches and lockers with illustrations has grown to large proportions. All degrees of gaudiness of color and all sorts of subjects are included. The souvenir postal card is a favorite; sometimes dozens of these form a group. Undoubtedly such pictures are a distracting

influence and give a general impression of disorder. The men do not always make a proper choice of subjects, and superintendents and foremen are compelled to exercise a censorship. The rule of exclusion seems a good one. In a well organized shop, where the effort is making constantly to procure the maximum of production, the creation of a decorative setting of the sort referred to can scarcely be regarded as in line with the main object. An atmosphere of industry is not so promoted.

Correspondence

A Suggestion for Vacuum Electric Steel

To the Editor: The numerous articles which have appeared lately in regard to the improved quality of steel produced from the electric furnace seem to emphasize these points:

1. The electric furnace for purifying molten steel is here to stay.

2. The quality of the steel so treated is so much better than either open-hearth of Bessemer that the consumer is willing to pay a higher price for this product.

3. The extra toughness of this steel is invaluable in rails inasmuch as the high carbon rails at present used, produced from either open-hearth or Bessemer steel, are brittle, especially in cold weather.

4. It seems that this electric steel will stand a higher percentage of carbon without being as brittle as the regular open-hearth or Bessemer steel, thus increasing the wearing qualities and life of the rail.

5. The improved quality in the electric furnace steel is due solely to the absence of segregations, gases and the practical removal of the oxides, sulphides and phosphides. Thus there is a purifying action only and the electric current itself does not impart any quality whatever.

6. The consumer desires the best quality that he can afford and the demand for this steel will be greater than the supply just as soon as the cost of production can be reduced so that it will not cost a great deal more—say, $2 to $3 per ton above the present price of open-hearth steel. The present selling price of electric furnace steel rails appears to be $10 per ton over the open-hearth rail.

Now, by taking a ladle of open-hearth or Bessemer steel, placing this in a vacuum chamber in which a vacuum could be maintained during treatment, and having the two electrodes incased in firebrick sleeves so that when dropped into the metal the action between the two electrodes takes place near the bottom of the ladle, we would have the following results:

1. Atmospheric pressure being removed from the surface of the metal, it would boil at a lower temperature.

2. The gases would be driven out of the metal absolutely.

3. The unreduced sulphides, etc., with any occluded slag would float on top of the metal, and as the ladle is poured from the bottom, would be on top of the last ingot poured.

4. The metal would be thoroughly mixed and uniform throughout, due to the active boiling through which it has passed.

This process should be finished in 20 minutes and would require less electric energy than the ordinary electric furnace, due to two facts:

1. The metal remains in the same ladle, hence is not cooled by pouring into an electric furnace.

2. It will not require so much power nor for so long a period, as it will boil at a lower temperature in a vacuum and will be finished in a much shorter time.

Since the high cost of electric steel is due to the large amount of electricity necessary, which amounts to from 300 to 500 kw.-hours per ton of steel produced, it is readily seen that the heat so produced should be conserved and reduced in amount as much as possible. Everybody is familiar with the vacuum thermos bottle as to its efficiency in retaining heat.

The ladle of molten steel placed in a vacuum, where the distance to the walls of the vacuum chamber is 10 or 15 ft. and where the ladle has a cover over the top, should lose its heat very slowly and the metal would retain practically all the heat imparted to it by the electric energy.

This article is contributed as a suggestion for the advancement of the science of better quality steel. The writer has experimented a little with the vacuum electric furnace—enough to find that the results look very promising.

FRANCIS SPEARMAN ADAMS.

DENVER, COLO., March, 1913.

Comment on the Proposal

Complying with the request of *The Iron Age* for comment on the suggestion contained in the above, the American Electric Furnace Company, New York, through A. H. Strong, writes as follows:

"Mr. Adams is probably right in the theory he has advanced, but only actual experience can demonstrate whether his suggestions will work out successfully in actual practice. We quite agree with his statements, Nos. 1, 2, 3, 5 and 6, and undoubtedly the electric furnace will soon be quite commonly used in steel refining. We do not believe that electric steel rails *per se* can stand a higher percentage of carbon than open-hearth or Bessemer steel rails, without becoming brittle, unless it is considered that electric steel rails are synonymous with lower sulphur and phosphorus and occluded gases, than open-hearth or Bessemer steel rails, which would be a sufficient explanation without reference to high carbon.

"We can quite appreciate that if it were found practicable to treat a ladle of open-hearth or Bessemer steel in a vacuum, such treatment would materially assist in removing the occluded gases, such as nitrogen, etc., with great benefit to the quality of the steel. We imagine, however, that the production of the necessary vacuum presents some engineering difficulties, and in any case it could only be secured at some appreciable expense per ton of metal treated. Whether a vacuum treatment would assist in removing occluded slag, such as sulphide of manganese, etc., we do not know; but at first sight it seems difficult to understand why a reduction in the atmospheric pressure should tend to force the slag to rise to the surface of the metal.

"There is no difficulty in thoroughly mixing steel in, for example, electric furnaces of the induction type, without recourse to vacuum conditions.

"Finally, we may perhaps add that Mr. Adams's suggestions might be found valuable in connection with the Tropenas process, as this work is carried out on comparatively small amounts at any one time."

Further Decline in Steel Corporation Orders

The monthly report of unfilled orders published by the United States Steel Corporation this week showed a decline of 170,654 tons in February, or from 7,827,368 tons on January 31, to 7,656,714 tons on February 28. In January the falling off was 104,796 tons, while in December there was a gain of 79,281 tons. The table below shows that with only two exceptions each month from May, 1911, to December, 1912, showed an increase in unfilled orders:

February 28, 1913....	7,656,714	September 30, 1911...	3,611,317
January 31, 1913.....	7,827,368	August 31, 1911.....	3,584,085
December 31, 1912....	7,932,164	July 31, 1911.....	3,695,985
November 30, 1912...	7,852,863	June 30, 1911.....	3,361,058
October 31, 1912.....	7,594,381	May 31, 1911.....	3,113,187
September 30, 1912...	6,551,597	April 30, 1911.....	3,218,704
August 31, 1912.....	6,163,375	March 31, 1911.....	3,447,301
July 31, 1912.....	5,957,079	February 28, 1911....	3,400,543
June 30, 1912.....	5,807,346	January 31, 1911 ...	3,110,919
May 31, 1912.....	5,750,563	December 31, 1910...	2,674,757
April 30, 1912.....	5,664,885	December 31, 1909...	5,927,031
March 31, 1912.....	5,304,841	December 31, 1908...	3,603,527
February 29, 1912....	5,454,200	December 31, 1907...	4,624,552
January 31, 1912.....	5,379,721	December 31, 1906...	8,489,719
December 31, 1911...	5,084,761	December 31, 1905...	7,605,086
November 30, 1911...	4,141,955	December 31, 1904...	4,696,203
October 31, 1911.....	3,694,328	December 31, 1903...	3,215,123
		December 31, 1902...	5,347,523

Locomotive Orders.—The American Locomotive Company has received orders from the Buffalo, Rochester & Pittsburgh Railway for 12 Mikado and 3 Pacific type engines; from the Chicago, Peoria & St. Louis for 10 consolidation locomotives; from the Chicago & Western Indiana for 5 switching engines, and from the Chicago, Terre Haute & South Eastern for 5 consolidation engines.

The Iron and Metal Markets

More Inquiry for Pig Iron

Lower Prices for Foundry and Basic

An Unprecedented Volume of Specifications in Finished Lines

Manufacturing consumers of steel products reinforce the confident views of the steel companies by continued large specifications on their contracts. It is not surprising, with the heavy accumulations on order books, that new business is not up to the present record rate of output; the surprise is that there is so much new buying.

That consumers are specifying farther ahead than ever and are rarely giving the mills a chance to cancel any part of their monthly quotas shows confidence in the continuance of present conditions far on in the year.

Chicago notes some shading of prices in recent sales of axles, track fastenings and tie plates, but these are conspicuous exceptions. Here and there prices of plates and shapes for early deliveries are easier, but all contract prices are very firm and mills in some cases have been offered third quarter business which they could not accept.

Considerable amounts of car material have just been placed for the third quarter. Meantime new car orders are limited by the delivery factor. Some kinds of cars can be had in five months; for others buyers would have to wait seven to nine months.

The demand for structural material in the Central West is now more active than at any time since the summer of 1912. For the addition to the Cuyahoga Works of the American Steel & Wire Company at Cleveland a 1050-ton contract has been placed. The Lake Shore Railroad has asked bids on 2000 tons for bridges and a Grand Rapids, Mich., hotel will require 2500 tons. For new steel works buildings at Cleveland several thousand tons will be needed. Two Eastern companies divided the bulk of the Norfolk & Western's 7400 tons of bridge steel. In Connecticut a four-track bridge over the Thames will soon be up for figures. In New York City the Lord & Taylor store, 7500 tons, went to the Hay Foundry & Iron Works.

The National Tube Company has taken a contract for 190 miles of 10-in. and 12-in. line pipe, about 15,000 tons, for shipment to Canada. Other large pipeline business is about to be closed.

Bar mills are sold up to an extent that makes premium business surprisingly large. Some mills have had to refuse third quarter orders. Under such conditions the outlook for concessions on agricultural bar contracts is not bright. The average price on bar iron shipments by the leading producer in the Central West was 1.45c. in the past two months, which gives puddlers the high rate of $6.60, an advance of 15 cents.

Wire and tin plates are the least active lines. In the former specifications against contracts have been much lighter than was expected. It is explained that large amounts of low-priced wire products were taken out late last year to avoid cancellations.

Almost daily inquiries come out for small lots of steel billets and sheet bars on which mills cannot make deliveries. A Youngstown open-hearth plant which will start up early in April will give some relief, as a part of its steel will go on the market. Eastern steel makers have a 5000-ton billet inquiry from Austria-Hungary, but have nothing to offer.

The pig-iron situation has changed to one of larger inquiry in nearly all selling centers, but with no increase in sales. Foundry buyers are sounding the market for third quarter and second half, but are not disposed to pay prices recently quoted. Sellers are standing on the current consumption, which shows no falling off, while buyers make much of the recent increase in merchant iron production.

Weakness in Southern iron is more pronounced, several furnace companies being disposed to meet the $13 level for No. 2 foundry fixed by resale iron. In Chicago, the Central West and Eastern Pennsylvania, foundry iron has declined about 25 cents in the week.

After a long wait, steel-making pig iron is more active. At Pittsburgh a sale of 2500 tons of basic iron is reported at $17 delivered, or $16.10 at Valley furnace, and the same consumer is expected to close for more on the same basis. Two Youngstown steel companies are likely to buy Bessemer iron, and the Steel Corporation may soon be in the market. In February 10,000 tons of pig iron was shipped by the Steel Corporation from Youngstown to Gary, and its Youngstown and Lorain, Ohio, furnaces will make further shipments to the same plant throughout March.

Reports from German and British markets are less favorable. In Germany bars have declined, this being the first official reduction in finished steel prices in months. Delivery periods in various finished lines are shortening and there is even discussion of the possibility of a shortage of work at some mills by the end of spring.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month and one year previous.

	Mar. 12, 1913.	Mar. 5, 1913.	Feb. 12, 1913.	Mar. 13, 1912.
Pig Iron, Per Gross Ton:				
Foundry No. 2 X, Philadelphia.	$17.80	$17.80	$18.25	$14.85
Foundry No. 2, Valley furnace.	17.00	17.00	17.00	13.00
Foundry No. 2 S'th'n, Cin'ti...	*16.25*	16.50	16.75	13.50
Foundry No. 2, Birmingham, Ala.	*13.00*	13.25	13.50	10.25
Foundry No. 2, furnace, Chicago*	17.25	17.25	17.25	14.00
Basic, delivered, eastern Pa....	*17.75*	18.00	18.00	14.25
Basic, Valley furnace	*16.10*	16.25	16.35	12.85
Bessemer, Pittsburgh	18.15	18.15	18.15	15.15
Malleable Bessemer, Chicago*..	17.25	17.25	17.25	14.00
Gray forge, Pittsburgh.....	*16.90*	17.15	17.15	13.40
Lake Superior charcoal, Chicago	18.00	18.00	18.00	15.75
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh....	28.50	28.50	28.50	19.50
Open hearth billets, Pittsburgh..	29.00	29.00	29.00	19.00
Forging billets, Pittsburgh.....	36.00	36.00	36.00	26.50
Open hearth billets, Philadelphia	32.00	32.00	32.00	22.40
Wire rods, Pittsburgh	30.00	30.00	30.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	16.25	16.25	16.25	15.00
Iron rails, Philadelphia	18.00	18.00	18.00	15.50
Car wheels, Chicago	16.75	16.75	16.75	13.00
Carwheels, Philadelphia	15.00	15.00	15.50	11.75
Heavy steel scrap, Pittsburgh..	**14.25**	14.00	14.25	12.75
Heavy steel scrap, Chicago.....	12.00	12.00	12.25	10.75
Heavy steel scrap, Philadelphia	12.50	12.50	13.00	11.75
Finished Iron and Steel, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.67½	1.67½	1.67½	1.22½
Iron bars, Pittsburgh	1.70	1.70	1.70	1.25
Iron bars, Chicago	1.57½	1.57½	1.60	1.15
Steel bars, Pittsburgh, future..	1.40	1.40	1.40	1.10
Steel bars, Pittsburgh, prompt..	1.85	1.85	1.70	1.10
Steel bars, New York, future..	1.56	1.56	1.56	1.26
Steel bars, New York, prompt..	2.01	2.01	1.86	1.26
Tank plates, Pittsburgh, future.	1.45	1.45	1.45	1.10
Tank plates, Pittsburgh, prompt	1.70	1.70	1.70	1.10
Tank plates, New York future..	1.61	1.61	1.61	1.26
Tank plates, New York, prompt	1.76	1.76	1.86	1.26
Beams, Pittsburgh, future.....	1.45	1.45	1.45	1.15
Beams, Pittsburgh, prompt.....	1.70	1.70	1.70	1.15
Beams, New York, future.....	1.61	1.61	1.61	1.31
Beams, New York, prompt.....	1.86	1.86	1.86	1.31
Angles, Pittsburgh, future.....	1.45	1.45	1.45	1.15
Angles, Pittsburgh, prompt.....	1.70	1.70	1.70	1.15
Angles, New York, future.....	1.61	1.61	1.61	1.31
Angles, New York, prompt.....	1.86	1.86	1.86	1.31
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.10
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.15
Steel hoops, Pittsburgh	1.60	1.60	1.60	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Pound to Large Buyers:	Mar. 12, 1913. Cents.	Mar. 5, 1913. Cents.	Feb. 12, 1913. Cents.	Mar. 13, 1912. Cents.
Sheets, black, No. 28, Pittsburgh	2.35	2.35	2.35	1.80
Wire nails, Pittsburgh	1.75	1.75	1.75	1.60
Cut nails, f.o.b. Eastern mills	1.80	1.80	1.80	...
Cut nails, Pittsburgh	1.70	1.70	1.70	1.55
Fence wire, ann'l'd, 0 to 9, Pgh.	1.55	1.55	1.55	1.40
Barb wire, galv., Pittsburgh	2.15	2.15	2.15	1.90
Coke, Connellsville, Per Net Ton, at Oven:				
Furnace coke, prompt shipment	*$2.40*	$2.50	$2.50	$2.15
Furnace coke, future delivery	2.50	2.50	2.50	2.15
Foundry coke, prompt shipment	3.00	3.00	3.50	2.50
Foundry coke, future delivery	3.00	3.00	3.50	2.50
Metals, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	**15.12½**	15.00	16.00	14.62½
Electrolytic copper, New York	**15.00**	14.87½	15.75	14.50
Spelter, St. Louis	**6.25**	6.20	6.35	7.00
Spelter, New York	**6.40**	6.35	6.50	7.15
Lead, St. Louis	4.20	4.20	4.20	3.92½
Lead, New York	4.35	4.35	4.35	4.00
Tin, New York	*46.60*	48.50	49.30	42.25
Antimony, Hallett, New York	*8.50*	8.62½	9.00	7.37½
Tin plate, 100-lb. box, Pittsburgh	$3.60	$3.60	$3.60	$3.30

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.75c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 2	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. to 1.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to length, under 3 ft., to 2 ft. inclusive	.25
Cutting to length, under 2 ft., to 1 ft. inclusive	.50
Cutting to length, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.55; galvanized, $1.95. Galvanized barb wire, to jobbers, $2.15; painted, $1.75. Wire nails, to jobbers, $1.75.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.70	$1.75	$1.80	$1.85	$1.95	$2.05	$2.15	$2.25
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight) in effect from January 1, 1913, iron pipe (full weight), from October 21, 1912:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜	73	52½	¼ and ⅜	67	48
½	77	66½	½	66	47
¾ to 3	80	71½	¾	70	57
			¾ to 2½	73	62

Lap Weld.

2	77	68½	1¼	57	46
2½ to 6	79	70½	1½	68	57
7 to 12	76	65½	2	69	59
13 to 15	53	..	2½ to 4	71	62
			4½ to 6	71	62
			7 to 12	69	56

Plugged and Reamed.

1 to 3, butt	78	69½	1 to 1½, butt	71	60
2, lap	75	66½	2, butt	72	61
2½ to 4, lap	77	68½	1¼, lap	55	44
			1½, lap	66	55
			2, lap	67	57
			2½ to 4, lap	69	60

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜	68	57½	⅜	64	53
½	73	66½	½	68	61
¾ to 1½	77	70½	¾ to 1½	72	63
2 to 3	78	71½	2 and 2½	73	64

Lap Weld, extra strong, plain ends.

2	74	65½	1½	66	60
2½ to 4	76	67½	2	67	59
4½ to 6	75	66½	2½ to 4	71	62
7 to 8	68	57½	4½ to 6	70	61
9 to 12	63	52½	7 and 8	64	54
			9 to 12	59	48

Butt Weld, double extra strong, plain ends.

½	63	56½	½	58	50
¾ to 1½	66	59½	¾ to 1½	61	53
2 to 2½	68	61½	2 to 2½	63	55

Lap Weld, double extra strong, plain ends.

2	64	57½	2	56	50
2½ to 4	66	59½	2½ to 4	61	55
4½ to 6	65	58½	4½ to 6	60	54
7 to 8	58	47½	7 to 8	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers in carloads on lap welded steel, in effect from February 1, 1913, and standard charcoal iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap Welded Steel.		*Standard Charcoal Iron.*	
1¾ and 2 in.	60	1½ in.	44
2¼ in.	57	1¾ and 2 in.	48
2½ and 2¾ in.	63	2¼ in.	44
3 and 3½ in.	68	2½ and 2¾ in.	53
3½ to 4½ in.	70	3 and 3½ in.	55
5 and 6 in.	63	3½ to 4½ in.	58
7 to 13 in.	60	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¼ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.70
Nos. 9 and 10	1.75
Nos. 11 and 12	1.80
Nos. 13 and 14	1.85
Nos. 15 and 16	1.95

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11	2.00
No. 12	2.00
Nos. 13 and 14	2.05
Nos. 15 and 16	2.10
Nos. 17 to 21	2.15
Nos. 22 and 24	2.20
Nos. 25 and 26	2.25
No. 27	2.30
No. 28	2.35
No. 29	2.40
No. 30	2.50

Galvanized Sheets of Black Sheet Gauge.

	Cents per lb.
Nos. 10 and 11	2.50
No. 12	2.60
Nos. 13 and 14	2.60
Nos. 15 and 16	2.75
Nos. 17 to 21	2.90
Nos. 22 and 24	3.05
Nos. 25 and 26	3.20
No. 27	3.35
No. 28	3.50
No. 29	3.65
No. 30	3.80

Pittsburgh

PITTSBURGH, PA., March 11, 1913.

Leading steel companies report more new inquiry for delivery in the last half of the year than at any time for several months. Consumers realize that, with the heavy obligations on the books of the mills, it behooves them to place orders early to get deliveries wanted late in the year, and quite a number of contracts for finished iron and steel are being placed for last half. Indications are stronger that the great activity among the steel works and finishing mills is going to last over the entire year. The only two lines in which specifications are not satisfactory are wire products and tin plate. A strong feature of the situation is that the new demand is legitimate, being for actual wants of consumers. While the country is making pig iron at a rate of over 34,000,000 tons a year, it is going into actual consumption and there has been no accumulation of stocks. The scarcity in steel is as great as ever and there are almost daily inquiries for small lots which the mills are not able to supply. The two weak spots in raw material, scrap and coke, are firmer and furnace coke seems to have settled down to $2.50 a ton at oven. The whole market looks stronger from every angle than it did two weeks ago.

Pig Iron.—As indicating how low the stocks of pig iron held by the large steel companies have fallen, the Carnegie Steel Company shipped in February more than 10,000 tons of pig iron from Youngstown to Gary to help out the Indiana Steel Company. This month shipments of basic iron from Lorain and Youngstown have been going forward to Gary and will probably continue to do so during the entire month. Some inquiry has come out for basic iron and some deals have been closed. The N. & G. Taylor Company, Cumberland, Md., bought one lot of 3000 tons and another of 1500 tons at $17.75, delivered at Cumberland, for shipment over last half. If this iron was shipped from Valley furnaces it would figure out $16.10 at furnace, but it is probable that the greater part will come from districts that have a slightly lower rate of freight. A local open-hearth steel plant has bought 2500 tons of basic for third quarter from a Valley interest at $17, delivered, or $16.10 at furnace, and may close this week for 5000 tons at about the same price. As yet there is no new inquiry for Bessemer iron, but two Youngstown consumers are expected to come in the market at an early date for a considerable tonnage for about May and June delivery, and further, it is not unlikely that the Steel Corporation may before long ask for a considerable tonnage of Bessemer and basic. The American Steel Foundries, which inquired for 2000 tons of basic iron per month for delivery at its Sharon works, after getting prices from a number of furnace interests, decided not to buy at present and is routing some iron originally intended for Alliance to Sharon. Foundry iron is quiet, but there has been some inquiry for forge iron, which is reported scarce. We note a sale of 300 tons of Bessemer iron for March shipment at $17.25, Valley furnace, and 2000 tons of forge for second quarter at $16. We quote: Standard Bessemer iron, for delivery up to July, $17.25; basic, $16.10; malleable Bessemer, $17 to $17.25; No. 2 foundry, $17 to $17.25; gray forge, $16 to $16.25, all f.o.b. Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Billets and Sheet Bars.—The shortage of steel is reported to be as acute as ever. Almost daily inquiries are out for small lots of billets and sheet bars for prompt shipment on which the mills cannot make the deliveries wanted. A good part of this business goes to dealers who have secured some steel in trades for pig-iron and scrap. A sale is reported of about 600 tons of open-hearth sheet bars for second quarter at above $30, Pittsburgh, and small lots of Bessemer and open-hearth billets for prompt shipment have sold at about the same price. The Youngstown Sheet & Tube Company expects to start its new open-hearth plant shortly after April 1, and as part of the output will be sold in the open market it will relieve to some extent the shortage in the Youngstown and Niles districts. The steel market nominally is as follows: Bessemer billets, $28.50 to $29; Bessemer sheet bars, $29 to $29.50; open-hearth billets, $29 to $29.50, and open-hearth sheet bars, $29.50 to $30, f.o.b. mill, Pittsburgh or Youngstown. Forging billets, $36 to $37, and axle billets, $34 to $35, Pittsburgh.

Ferroalloys.—Deliveries on ferromanganese contracts are reported better than for some time. Occasionally a delayed shipment will compel a consumer to come in the market and buy a carload or two to tide him over until his material arrives, and sales of this kind are about all that are being made in the local market at present. We note sales of three carloads, or about 90 tons, of 80 per cent. foreign ferromanganese at $64, seaboard. Ferrosilicon is reported scarce and in some cases consumers are not getting as prompt deliveries as desired. We quote 80 per cent. foreign ferromanganese at $64 to $65, Baltimore, the rate to Pittsburgh being $1.95 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 600 tons, $74; over 600 tons, $73, Pittsburgh. We quote 10 per cent. at $24; 11 per cent., $25; 12 per cent., $26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over and 12½c. in lots up to 2000 lb.

Wire Rods.—While the trade in wire and wire nails is dull, rods are fairly active. Consumers are specifying freely against contracts. The market is firm. We quote Bessemer, open-hearth and chain rods at $30 Pittsburgh.

Muck Bar.—An inquiry is reported for 500 tons for second quarter, on which a local maker is said to have quoted $31, Pittsburgh.

Skelp.—The skelp mills are filled with specifications for several months ahead, while there is a fairly active new inquiry. A large inquiry is in the market for iron pipe, and a local mill that rolls iron plates is figuring on getting a good part of the plate tonnage that will go into this line if it is placed. We quote grooved skelp at 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.90c., delivered at buyers' mills in the Pittsburgh district.

Steel Rails.—The Carnegie Steel Company has taken a contract for 20,000 M-25 steel ties for the Cleveland Railways Company, Cleveland, Ohio. These ties weigh 14½ lb. per yd. and will be rolled at the Homestead Works. There have been no recent orders for standard sections. The Carnegie Company received new contracts and specifications for light rails in the past week for about 3500 tons, and is about two months behind in its orders. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Carwheels.—A number of large inquiries for steel and cast-iron carwheels are in the market. It is stated that the Baltimore & Ohio Railroad is figuring on the purchase of 50,000 to 60,000. We quote 33-in. rolled steel wheels for freight service at $15 to $15.50 and 36-in. for passenger cars at $19 to $19.50 per wheel, f.o.b. Pittsburgh.

Structural Material.—Some time ago the American Bridge Company took the contract from the Pennsylvania Lines West for about 7000 tons for main spans for the Ohio connecting bridge over Brunot's Island, in this city, and the company has just taken a second contract for two channel spans, 476 and 525 ft. for this bridge, requiring about 6000 tons. The McClintic-Marshall Construction Company has taken 500 tons for a new foundry building for the Westinghouse Air Brake Company, Wilmerding, Pa., and the Carbon Steel Company is expected to place this week 250 to 300 tons for additions to mill buildings. New inquiry is heavy. Leading local fabricators state that they have about all the work on their books now that they can take care of in the next four or five months. On nearly all new jobs fabricators are said to be figuring on the 1.45c. basis for beams and channels up to 15 in., and are therefore getting better prices. We quote beams and channels up to 15 in. at 1.45c. to 1.50c. for delivery at convenience of the mill, which would be second half of this year, while small lots from warehouse for prompt delivery are bringing from 1.60c. up to 2c., depending on the size of the order and the deliveries wanted.

Plates.—The Pennsylvania Railroad is reported in the market for 4500 more freight cars and is also figuring on 57 passenger cars. The Erie Railroad has placed orders for 500 freight cars with the Western Steel Car & Foundry Company and 10 locomotives with the American Locomotive Company. The Boston & Maine Railroad inquiry for 6000 cars is expected to be placed this

week. Other inquiries pending include 500 freight cars from the Norfolk & Southern, 3000 from the Chesapeake & Ohio and about 1500 from the Seaboard Air Line. It is claimed that actual inquiries in the market total upward of 15,000 cars. The car shops are pretty well filled for the next four or five months and still report a good deal of delay in getting material from the plate mills. The Pressed Steel Car Company is turning out close to 100 cars per day at McKees Rocks and Woods Run Works and the Standard Steel Company from 60 to 75 cars per day at its Butler plant. We quote ¼-in. and heavier tank plate at 1.45c., Pittsburgh, for forward delivery, while for shipment in three to four weeks 1.60c. to 1.65c. is quoted for carload and larger lots, and from 1.75c. to as high as 2c. for small lots, f.o.b. Pittsburgh.

Iron and Steel Bars.—The new demand for both iron and steel bars continues heavy, while specifications are coming into the mills at an unprecedented rate. Some of the implement makers whose contracts for steel bars will expire July 1 are inquiring about contracts for the year commencing on that date but so far nothing has been done. The market on steel bars is very strong at 1.40c. for future delivery, and with the present high prices of steel billets and all raw materials, it is a question whether the mills will allow the implement makers and other large consumers the usual differential in contract prices over smaller consumers. All the steel and iron bar mills are considerably behind in deliveries and shipments this month will probably break all records. A new finishing mill is being added to the Duquesne works of the Carnegie Steel Company to roll flats and rounds, which will be ready in about two months. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill, which would not be before third quarter, while for shipment from warehouses 1.90c. to 2c. is quoted. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt delivery. Mills charge $1 extra per ton for twisting ¾ in. and larger steel bars and $2 extra for ½ to ⅝ in.

Sheets.—Local makers of sheets report that no concessions in prices are being made in this market such as are reported to exist in Western districts. All the sheet mills in the Pittsburgh and nearby districts have actual orders on their books taking their entire output to July or longer, and some of them have considerable tonnage sold for delivery in third quarter. With the new demand so heavy, specifications coming in at an enormous rate, and sheet bars ruling at $29 to $30 at maker's mill, the sheet manufacturers state that there is no reason whatever for any cutting. The extras on enameling stock have been advanced from 15c. to 25c. per 100 lb., this being a special grade of tin mill sizes of black sheets furnished in squares and pickled. All the sheet mills are operating at 85 to 90 per cent. of capacity and will no doubt maintain this for some months. We quote 1.75c. for No. 10 blue annealed; 2.35c. for No. 28 Bessemer black sheets; 3.50c. for No. 28 galvanized, and 2.30c. for No. 28 tin mill black plate. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Makers report that specifications so far this year have been a disappointment, being considerably lighter than anticipated. In November and December, jobbers and consumers specified heavily against old contracts taken by the mills at lower prices than are ruling now, and thus accumulated rather heavy stocks which have not yet been worked off. It is believed that this month or early in April specifications will show a material increase, as contracts placed last year for delivery this year were enormously heavy. The tin plate mills are operating at 75 to 80 per cent. of capacity and are accumulating large stocks to ship against specifications. It is announced that the much talked of consolidation of a number of leading tin plate mills has been declared off. We quote 100 lb. cokes at $3.60, 100 lb. ternes at $3.45, and No. 28 black plate at $2.30, all f.o.b. Pittsburgh.

Spelter.—The new demand is heavier and prices have shown a sharp advance. We quote prime grades of Western at 6.25c., East St. Louis, equal to 6.37½c., Pittsburgh.

Railroad Spikes.—During January and February there was a lull in specifications from the railroads and the spike makers have been able to catch up on deliveries to some extent. With the beginning of track laying a material increase in specifications is expected. Makers have their product practically sold up to July or longer. We quote railroad spikes in base sizes, 5½ x 9/16 in., on large contracts with the railroads, at $1.80, while for carload lots $1.90 is charged; small railroad and boat spikes, $1.90 to $2 per 100 lb., f.o.b. Pittsburgh for forward delivery.

Hoops and Bands.—Some new inquiry is in the market for hoops and bands for delivery in last half. Mills report that specifications against contracts continue to come in freely and they are back in deliveries from eight to ten weeks. We quote hoops at 1.60c. to 1.65c. and steel bands at 1.40c. to 1.45c., with extras as per steel bar card, these prices being on orders for delivery at convenience of the mills.

Shafting.—Specifications against contracts are reported to be coming in freely but the new demand is only fair, as consumers are covered up to July or longer. It is stated that discounts are being firmly held. We quote cold-rolled shafting at 58 per cent. off in carload and larger lots and 52 per cent. in small lots delivered in base territory.

Bolts and Rivets.—Local makers are back in deliveries six to ten weeks and reports of cutting in prices in the local market are denied. Premiums for prompt shipments ranging from $2 to $5 a ton are still being paid by consumers. We quote button head structural rivets at $2.20 and cone head boiler rivets at $2.30 per 100 lb. The discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 5% off
Small carriage bolts, rolled threads	75 and 10% off
Large carriage bolts	70% off
Small machine bolts, cut threads	75 and 10% off
Small machine bolts, rolled threads	75, 10 and 5% off
Large machine bolts	70 and 7% off
Machine bolts with C.P.C. and T nuts, small	75 and 5% off
Machine bolts with C.P.C. and T nuts, large	70% off
Square hot pressed nuts, blanked and tapped	$5.70 off list
Hexagon nuts	$6.30 off list
C.P.C. and R. square nuts, tapped and blank	$5.70 off list
Hexagon nuts, ⅝ and larger	$6.60 off list
Hexagon nuts smaller than ⅝	$7.20 off list
C.P. plain square nuts	$5.20 off list
C.P. plain hexagon nuts	$5.50 off list
Semi-finished hexagon nuts ⅝ and larger	85% off
Semi-finished hex. nuts smaller than ⅝	85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off

Merchant Steel.—Specifications against contracts so far this month are reported to be larger than in the same time in February, and shipments in March may create a new record. All the mills are still back in deliveries to a considerable extent and owing to the scarcity of steel are not catching up fast. We quote: Iron finished tire, 1½ x ⅜ in. and larger, 1.40c. to 1.55c., base; under 1½ x ⅜ in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, ¾ to ⅞ and 1 in., 1.90c. to 2c.; 1⅛in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Wire Products.—Specifications against contracts for wire products so far this year have been unsatisfactory, being much lighter than anticipated. In the closing two months of last year jobbers and consumers specified heavily against their contracts for wire and wire nails for fear of cancellations and thus accumulated quite heavy stocks, which are gradually being worked off. For this reason specifications against new contracts at the higher prices now ruling have not been coming in freely, although they are expected to improve in the near future. Prices are reported firm. We quote wire nails at $1.75 per keg; cut nails, $1.70 per keg; galvanized barb wire, $2.15 per 100 lb.; painted, $1.75; annealed fence wire, $1.55, and galvanized fence wire, $1.95, f.o.b. Pittsburgh, usual terms, freight added to point of shipment. Jobbers charge the usual advances for small lots from store.

Merchant Pipe.—The new demand is fairly heavy, and so far this month has shown an improvement over the same period in February. The National Tube Company has taken a contract from the Ontario Gas Company of Canada for 190 miles of 10 and 12 in. line pipe to be used in distributing gas in the province of Ontario. This will require about 15,000 tons of pipe. Other large gas and oil projects are under way and a tentative inquiry is in the market for a heavy tonnage of iron pipe. Indications are that the demand this year for the larger sizes of pipe for gas and oil lines will be greater than ever before. The recent unevenness in discounts

on iron pipe of about 2½ per cent. is said to have disappeared. It is claimed that the regular discounts on both iron and steel pipe, as printed on a previous page, are now being firmly held.

Boiler Tubes.—We note a continued heavy demand for both iron and steel boiler tubes on which the mills are back in deliveries six to eight weeks or longer. The new demand for seamless tubing continues heavy, some makers reporting they are back in deliveries 12 to 14 weeks. An advance in discounts on iron tubes is looked for at an early date.

Iron and Steel Scrap.—Low prices are ruling on wrought iron turnings and bundled sheet scrap. Little of the scrap material offered by the Pennsylvania and Baltimore & Ohio railroads was secured by Pittsburgh dealers, as the prices bid were not satisfactory. A leading Youngstown producer of scrap sold last week about 2500 tons of mashed pipe at $13.75, about 3000 tons of round pipe at $13.25 and about 3000 tons of bundled sheet scrap at close to $9.75, all per gross ton at sellers' works. Heretofore nearly all the material sold by this company has gone to an open-hearth steel interest in the Shenango Valley, but it is stated that most of recent sales were made to dealers. We also note sales of 250 tons of bundled sheet scrap at about $9.50 at seller's works; 300 tons of busheling scrap at $13 to $13.25 and 400 to 500 tons of iron car axles, delivered at buyer's mill, Pittsburgh district. We have again revised prices and now quote, per gross ton, delivered in the Pittsburgh district, as follows:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$14.25 to $14.50
No. 1 foundry cast	14.25 to 14.50
No. 2 foundry cast	13.25 to 13.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	10.50 to 10.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	16.25 to 16.50
No. 1 railroad malleable stock	13.50 to 13.75
Grade bars	10.75 to 11.00
Low phosphorus melting stock	17.00 to 17.25
Iron car axles	24.25 to 24.75
Steel car axles	17.75 to 18.00
Locomotive axles, steel	21.75 to 22.00
Locomotive axles, iron	26.00 to 26.25
No. 1 busheling scrap	13.25 to 13.50
No. 2 busheling scrap	9.50 to 9.75
Old carwheels	15.75 to 16.00
*Cast-iron borings	10.00 to 10.25
*Machine shop turnings	8.50 to 8.75
†Steel bar crop ends	16.00 to 16.25
Old iron rails	16.25 to 16.50
No. 1 railroad wrought scrap	16.00 to 16.25
Heavy steel axle turnings	12.50 to 12.75
Stove plate	10.25 to 10.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—It is evident that many consumers of furnace coke bought last fall more than their actual requirements, as suspensions of shipments ranging from one to three days are frequently asked for, resulting in considerable coke loaded on cars that has to be sold in the open market. There is not much new inquiry but prices are firm. We note sales of about 150 cars of standard grade furnace coke, or about 6000 tons, at $2.50 per net ton at oven, while sales of about 100 cars, or close to 4000 tons, are reported at $2.40 at oven. With little new inquiry for foundry coke, prices are fairly strong. We quote standard makes of furnace coke for prompt delivery at $2.40 to $2.50 and on contracts over remainder of the year at $2.50 at oven; standard makes of 72-hour foundry coke for prompt delivery, $3 to $3.50 at oven. Inferior grades of both furnace and foundry coke are offered at less than the above figures. The output of coke in the Upper and Lower Connellsville regions last week is given by the Connellsville Courier as 432,645 net tons, a decrease over the previous week of about 9000 tons.

Chicago

CHICAGO, ILL., March 11, 1913.

There are those who point to the falling off in new business and to the shading of prices in recent sales of axles, track fastenings and tie plates as evidence that the crest of the wave of buying has passed. If true, this is no more than the anticipated course of events, even discounting the heavy business that must arise in the second quarter. Such concessions as have been made, rather than representing any current weakness in the finished steel market, are but indications of the inroads that will be made in the second half on the business of the mills booked farthest ahead by other mills able to offer better delivery. A moderate tonnage of standard section rails was reported as placed the past week and street railroad inquiries are featured by the requirements of the Canadian Northwest. Buyers of steel, railroads in particular, continue their rush to insure delivery of contracts placed by specifying heavily, this being especially true of track fastenings. There is an active ordering of steel bars but as yet no contracting by the implement interests. For such pig-iron business as is offering furnaces are displaying increased anxiety to secure each order, with the usual result as to price. The scrap market shows practically no change.

Pig Iron.—The Northern pig-iron situation has arrived at that state where each letting by a good buyer attracts representatives from practically every selling interest. The competition undoubtedly exaggerates the weakness of each furnace thus represented but nevertheless results in the buyer securing an exceptionally low price and gives to the general situation an appearance of decided weakness. As a matter of fact, the important Northern furnaces are probably fairly well supplied with orders for the first half but inquiries are so scattered that almost any furnace can take the business offered. Contracts for the second half have been made the past week at $17.50, but at the same time this price appears to be the top of the market, and competitive business will bring out material concessions from that price. From the South the movement of spot iron absorbs practically all the current requirements. In carload lots, both resale and furnace iron have brought prices varying from $13.50 to $14, Birmingham, depending on analysis, but for third-quarter shipment there appears to be little doubt that $13.25 can be done. Even lower prices are reported but without confirmation. The general inquiry, while somewhat improved as to frequency, is discouraging because of the indefinite postponements generally following receipt of quotations. A number of sales of charcoal iron are reported. The following quotations are for iron delivered at consumers' yards except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$18.00 to $18.75
Northern coke foundry, No. 1	17.50 to 18.00
Northern coke foundry, No. 2	17.25 to 17.50
Northern coke foundry, No. 3	16.75 to 17.25
Southern coke, No. 1 foundry and No. 1 soft	18.35 to 18.85
Southern coke, No. 2 foundry and No. 2 soft	17.60 to 18.35
Southern coke, No. 3	17.10 to 17.60
Southern coke, No. 4	16.85 to 17.10
Southern gray forge	16.85 to 17.35
Southern mottled	16.35
Malleable Bessemer	17.25 to 17.75
Standard Bessemer	19.40 to 19.90
Basic	17.25 to 17.75
Jackson Co. and Kentucky silvery, 6 per cent.	20.40
Jackson Co. and Kentucky silvery, 8 per cent.	21.40
Jackson Co. and Kentucky silvery, 10 per cent.	22.40

Rails and Track Supplies.—Current reports of a disposition by railroads to proceed more conservatively, while they undoubtedly fit in with the decreasing amount of new business, are not supported by the exceptionally heavy specifications still pouring into the mills. One railroad, whose contract for tie plates was received but a few weeks ago carrying a large tonnage, has less than 100 tons remaining to be specified. Another road, whose contract for track fastenings provided for 35,000 kegs of spikes and 15,000 kegs of bolts, has sent in on one order instructions covering the entire contract plus several thousand additional kegs. Sales of 15,000 tons of standard section rails are reported. Street railroads are still actively in the market for girder rails and special track work. Among the especially interesting requirements are those from the street railroad companies of the cities of Edmonton and Regina in the Canadian Northwest, the total value of which is estimated at $200,000. The purchases are expected to be made this week. A sale of 300 tons of girder rails is also noted in this territory. We quote standard railroad spikes at 1.95c. to 2.05c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, $32 to $35 net ton; standard section Bessemer rails, Chicago, 1.25c. base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The total tonnage of contracts for fabricated steel noted the past week aggregates 4225 tons. Of this the largest item was 2055 tons for the Auditorium at Oakland, Cal., awarded to the American Bridge Company. The Chicago Steel Products Company took the contract for 729 tons for a lift bridge at Oshkosh, Wis. For the new plant of the Federal Plate Glass Company at Ottawa, Ill., the Decatur Bridge Company will supply 403 tons, and for an apartment building at New Orleans the Phoenix Iron Company will fabricate 113 tons. Local fabricators, while fairly fixed, report that on some classes of work,

especially such as can be used for filling-in purposes, sharply competitive prices are being made. The general situation as to prices and delivery from mill remains unchanged and we quote for Chicago delivery, 1.63c. to 1.68c.

Local jobbers of structural steel report an unceasing demand on their stocks, particularly in the lighter weight sections. Prices are unchanged and we quote from store 2.05c.

Plates.—Additional orders for cars and locomotives are scattered and of a miscellaneous character. The Grand Rapids & Indiana expects to buy four and the Chicago & Western Indiana five, six-wheel switching engines. With no possibility of obtaining cars for months, it is surprising to find many large inquiries in the market. Practically the only transactions in plates for industrial purposes are the orders taken by the smaller mills in a position to offer from four to six weeks' delivery. For Chicago delivery on mill shipments within six weeks we quote 1.78c. and for regular deliveries, 1.63c.

Notwithstanding the continuance of heavy ordering of plates from store, deliveries are obtainable with exceptional promptness, except where unusual cutting specifications cause delays. We quote from jobbers' stocks on base sizes 2.05c.

Sheets.—The general situation is not much changed, with some departures both in the direction of concessions and premiums over regular quotations where special conditions obtain. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.68c.; No. 10 blue annealed, 1.93c.

Reports indicate that the makers of automobile bodies using special grades of sheets are still finding mill deliveries inadequate to meet their needs, and in consequence are calling on jobbers' stocks for heavy shipments to fill their special requirements. For regular sheets out of store prices continue without change as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

Bars.—Specifications and new orders for steel bars are being received by the mills in substantial volume, but as yet no long-term contracting has been done. The question of how all of the bar business expected to materialize in the first half is to be taken care of by mills already filled up for a large portion of the second half may develop into a real problem. Orders for bar iron continue to develop from various quarters, aggregating a sufficient tonnage to fully occupy the mills in this territory and preserve the price situation firmly on the basis of 1.57½c. to 1.60c. We quote for mill shipment as follows: Bar iron, 1.57½c. to 1.62½c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 51 per cent. off.

Rivets and Bolts.—General business in bolts is quiet, being closely limited to specifications from jobbers who are balancing their stocks. Some of the railroads are in the market for machine bolts, notably the Northern Pacific. The demand for rivets is without special feature. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 75-10; cut thread, 75-5; larger sizes, 70-2½; machine bolts up to ⅜ x 4 in., rolled thread, 70-10-5; cut thread, 75-10; large size, 70-7½; coach screws, 80-10; hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt. Structural rivets, ¾ to 1¼ in., 2.38c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ⅜ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ⅜ x 6 in., 70-3; larger sizes, 65 off. Hot pressed nuts, square head, $5.30, and hexagon, $5.90 off per cwt.

Wire Products.—With the more active movement of nails and barb wire which accompanies the advent of spring, the evidences of higher prices which have been anticipated for some time are more pronounced. In contrast to the greater shipping activity attendant upon the approaching season, there appears to be some slowing up in the rate of wire mill operations, from which it may be assumed that warehouse and jobbers' stocks are well prepared for the demands of retail trade. We quote as follows: Plain wire, No. 9 and coarser, base, $1.73; wire nails, $1.93; painted barb wire, $1.93; galvanized, $2.33; polished staples, $1.93; galvanized, $2.33, all Chicago.

Cast-Iron Pipe.—The contract at Minneapolis for 1200 tons was formally awarded to the United States Cast Iron Pipe & Foundry Company. A small letting of 300 tons at Boscobel, Wis., is also noted. General inquiry is gradually increasing, although the business offering is largely for moderate requirements. We quote as follows per net ton, Chicago: Water pipe, 4 in., $30; 6 to 12 in., $28; 16 in. and up, $27, with $1 extra for gas pipe.

Old Material.—The return of real winter weather gave rise to the hope of at least one strengthening influence on the market. The hope, however, has been dissipated with the snow, and market conditions remain essentially unchanged from those prevailing a week ago. The Illinois Central Railroad is offering a list carrying 7000 tons, of which the most important item is 3000 tons of No. 1 wrought. The Chicago, Milwaukee & St. Paul has 1500 tons for disposal. The Baltimore & Ohio Chicago Terminal is selling 500 tons of rails and the Chicago & Alton a similar amount of miscellaneous material. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	$16.25 to $16.75
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 ft.	14.00 to 14.50
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	16.75 to 17.25
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart	12.00 to 12.50
Shoveling steel	11.75 to 12.25
Steel axle turnings	10.50 to 11.00

Per Net Ton.	
Iron angles and splice bars	$15.50 to $16.00
Iron arch bars and transoms	16.00 to 16.50
Steel angle bars	11.50 to 12.00
Iron car axles	21.00 to 21.50
Steel car axles	18.50 to 19.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.25 to 11.75
Cut forge	11.25 to 11.75
Steel knuckles and couplers	12.25 to 12.75
Steel springs	12.50 to 13.00
Locomotive tires, smooth	13.25 to 13.50
Machine shop turnings	7.50 to 8.00
Cast and mixed borings	6.50 to 7.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.75 to 8.25
No. 1 boilers, cut to sheets and rings	8.75 to 9.25
Boiler punchings	12.50 to 13.00
No. 1 cast scrap	12.50 to 13.00
Stove plate and light cast scrap	10.25 to 10.75
Railroad malleable	13.00 to 13.50
Agricultural malleable	11.50 to 12.00
Pipes and flues	8.75 to 9.25

Philadelphia

PHILADELPHIA, PA., March 11, 1913.

Keener interest in being shown in the pig-iron market, although transactions have not been large. In view of unsettled prices, consumers are awaiting some definite price level before making extensive purchases. Renewed activity has developed in several of the finished material lines. Plates have been the most active, with specifications again in excess of shipments. Billets have been in much better demand and an inquiry for 5000 tons for export has come out. Sheets are more active but prices for prompt shipments are easier. Iron bars are irregular, both in demand and price. The old material market shows increasing strength, but the movement is slow. Several round lot sales of No. 1 heavy melting steel have been made at $13.50 per gross ton, delivered. Coke is quiet with prices showing a firmer tendency. Locomotive builders in this district express most optimistic views of trade conditions. Orders have been very good and plant operations are at full capacity.

Iron Ore.—Demand is light and few negotiations of importance are pending. Importations of the week include 13,100 tons from Sweden and 16,300 tons from Cuba.

Pig-Iron.—Numerous consumers of foundry pig-iron are ready to make purchases for second quarter and would place orders at concessions. Under the present weak condition of the market, supplies in hand are being stretched and deliveries on contracts urged in order to defer buying until something more definite in prices becomes established. Producers, in view of the approaching buying movement, are more inclined to maintain the present range of prices, although some who have been holding around $18, delivered, for standard analysis No. 2X foundry will for regular customers meet quotations, which have been made at $17.80. At the meeting of the Eastern Pig Iron Association last week, opinion regarding future business was of a more optimistic character. Orders on hand fell off in February, as was to be expected, while stocks on furnace yards remained fairly stationary. In Virginia there was a sharp reduction in stocks in February. Buying of low-grade iron by cast-iron pipe makers in this district was less active. One consumer purchased several 1000-ton lots, as well as several broken lots of off-grade iron. No definite inquiry for any large tonnage of pipe

iron is now before the trade. In the higher grades of foundry iron buying is still confined to small lots, usually ranging from carloads to lots of a few hundred tons. As the bulk of the business is of a non-competitive nature, prices range from $18 to $18.25, delivered, although on sizeable business, when competition is sharp, $17.75 to $17.80 has been quoted for second quarter shipment. A moderate volume of business in Virginia foundry grades has been moving, principally in small lots, although one sale of 600 tons for New England delivery has been made. Prices of No. 2X Virginia foundry are firm at $15.50, furnace. Sales of small lots of Mayari pig-iron have been made at $22, furnace. Very little movement in rolling mill forge has developed; one large buyer is, however, expected in the market in the near future. Large consumers of basic iron are taking more interest, although not quite ready to negotiate for third quarter requirements. A moderate sale, to a central Pennsylvania consumer, was recently put through at $17.75, delivered, but buyers figure that that price can be shaded. Small lot sales of low phosphorus iron have been made at $24.50, delivered, while 1000 tons of misfit low phosphorus was closed on that basis for standard iron. While prices still have an irregular tendency and cover a wide range, dependent on the condition of order books, small sales have been put through at unchanged prices. For delivery in buyers' yards in this district the following range about represents the market for standard brands:

Eastern Pennsylvania No. 2 X foundry	$17.80 to $18.25
Eastern Pennsylvania No. 2 plain	17.50 to 18.00
Virginia No. 2 X	18.30 to 18.50
Virginia No. 2 plain	18.05 to 18.25
Gray forge	17.00
Basic	17.75 to 18.00
Standard low phosphorus	24.50

Ferroalloys.—Sales of several hundred tons of 80 per cent. ferromanganese have been made to consumers for March-April shipment, at $65, seaboard. There has been no inquiry for forward ferromanganese and prices are nominal at $65, seaboard. Importations of ferromanganese at this port last week aggregated 1450 tons. There is very little inquiry for either furnace or 50 per cent. grades of ferrosilicon.

Billets.—A sharp improvement in the demand for second and third quarter deliveries has developed. Consumers are more anxious to cover for forward requirements and eastern makers have entered a good volume of business, involving lots of several thousand tons of rolling billets, mostly for eastern consumers. Mills, while not inclined to sell far ahead, are entering regular customer's orders for third quarter. An interesting inquiry is for 5000 tons of rolling billets for export to Austria-Hungary, delivery over the remainder of the year. Specifications on contracts are coming in freely and mills continue fully engaged. Prices are firm, basic open hearth rolling billets being quoted at $32, delivered, with ordinary forging billets at $36 mill, minimum.

Plates.—Eastern mills have received a larger volume of business, the aggregate again exceeding the productive rate and deliveries have shown a further hardening. Inquiries are more numerous, quite a number of 1000-ton lots in car, bridge, locomotive and tank plates being before the trade. Eastern mills still refuse to sell for delivery beyond the first half of the year, although buyers are anxious to place contracts for extended shipment. Prices are firm, eastern mills quoting 1.75c. for sheared and 1.80c. for universal plates, for reasonable early delivery. As high as 2c. mill has been paid for prompt lots, involving small quantities.

Structural Material.—A very satisfactory volume of new business is coming to the mills, which are still unable to catch up with deliveries. New business has been largely of a miscellaneous character. Several round lot propositions in bridge and building work are, however, pending. Here and there small lots of plain shapes are available for early delivery, mills working such business in with regular rolling schedules. Prices are unchanged at 1.75c. delivered for plain shapes for early shipment and 1.85c. to 2c. when prompt deliveries are available.

Sheets.—Demand has been more active, but as the supply, particularly from Western mills, has been better, premiums heretofore easily obtainable by eastern mills are less in evidence. Eastern makers have entered a good volume of business and are now taking orders a shade more cautiously, as order books are again becoming better filled. Western No. 10 blue annealed sheets are quoted at 1.90c., delivered, while eastern mills making smooth, loose rolled sheets, quote from 1.95c. to 2c.

Bars.—A moderate demand for iron bars continues, but the aggregate volume of business is usually below mill capacity. While mills are well engaged, there is considerable variation in the volume of business on order books and the anxiety of some mills to get further tonnage has had a depressing influence on prices. Ordinary iron bars are available at 1.67½c. delivered here, although some mills are entering business at 1.72½ to 1.77½c. Steel bars are in good demand at unchanged prices, 1.55c. to 1.60c. delivered.

Coke.—While there has not been so much business passing, prompt furnace coke has firmed up owing to a decreased supply. Current quotations for prompt furnace coke range close to $2.50 at oven. Little contract furnace coke has been offered. Foundry coke has been selling in small lots at $3.25 to $3.75 at oven, for either prompt or forward shipment. The following range of prices, per net ton, delivered in buyer's yard in this district, is named:

Connellsville furnace coke	$4.50 to $5.00
Connellsville foundry coke	5.25 to 6.00
Mountain furnace coke	4.20 to 4.60
Mountain foundry coke	5.00 to 5.75

Old Material.—A decidedly better feeling is noted, notwithstanding the fact that little improvement in general buying has developed. Some little business has been put through at better prices. Two large consumers have bought an aggregate of several thousand tons of strictly No. 1 heavy melting steel at $13.50, delivered, but small lots of ordinary grade material are still available at $13. Dealers find it difficult to get better than $15.50 for No. 1 railroad wrought, although bids made direct to railroads by consumers were at higher prices. Old iron axles were sold last week at $27, delivered. In but few instances are dealers offering material, such business as is passing being usually against consumers' inquiries. The following range about represents the market for small lots, delivered in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel	$13.00
Old steel rails, rerolling (nominal)	$15.50 to 16.00
Low phosphorus heavy melting steel scrap	17.75 to 18.25
Old steel axle (nominal)	19.00 to 20.00
Old iron axles (nominal)	27.00 to 28.00
Old iron rails	18.00 to 18.50
Old carwheels	15.00 to 15.50
No. 1 railroad wrought (nominal)	15.00 to 15.50
Wrought-iron pipe	12.50 to 13.00
No. 1 forge fire	12.00 to 12.50
No. 2 light iron (nominal)	7.00 to 7.50
No. 2 cut busheling	10.00 to 10.25
Wrought turnings	10.00 to 10.50
Cast borings	10.00 to 10.50
Machinery cast	14.00 to 14.50
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00
Railroad malleable (nominal)	13.00 to 13.50

Morris, Wheeler & Co., iron and steel merchants, Sixteenth and Market streets, Philadelphia, Pa., announce that as the co-partnership existing under that name was terminated by the death of Theodore H. Morris, the following have associated themselves together and will continue the business in all its branches under the same style as heretofore: Frederick W. Morris, Andrew Wheeler, William Paul Morris, Frederick W. Morris, Jr., George L. Morris, C. Christopher Morris and Reginald H. Morris. Of these William Paul, George L. and C. Christopher Morris succeed jointly to the interest held in the former partnership by their father, so that the capital of the firm remains unimpaired.

Cleveland

CLEVELAND, OHIO, March 11, 1913.

Iron Ore.—Shipments from docks in February were 586,235 tons, or 147,000 tons greater than in February last year, and the largest amount shipped in that month for several years. The dock balance March 1 was 7,775,855 tons, or slightly less than on March 1, 1912. No new sales or inquiries are reported. No united action has as yet been taken by the shippers regarding the dock charges added by the railroads to their tariffs for ore shipped to Escanaba, Ashland and Marquette. However, one shipper, acting independently, which recently protested against the rate to the Interstate Commerce Commission, announces that it will fight the matter out before the commission. We quote prices as follows: Old Range Bessemer, $4.40; Mesaba Bessemer, $4.15; Old Range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

Pig Iron.—There is considerable inquiry for foundry iron for the last half but a rather limited amount of buying. One seller reports the sale of several lots aggregating about 5000 tons, partly for the last half, but with this exception no last-half sales are reported. The

inquiry coming out appears to be largely for the purpose of feeling the market and there has not been enough tonnage sold to establish last-half prices. In Cleveland and the immediate territory there is no demand. The local market is weak, quotations being about 25 cents a ton lower, and low prices are being made for shipment to distant points. For the last half $17 is being quoted by Cleveland and Valley furnaces for No. 2, and it is probable that $16.75 can be done. The latter price is being quoted for early shipment. The indications are that the last-half buying movement will set in shortly. The melt is apparently as heavy as ever. The Cleveland Furnace Company will go from foundry to basic iron this week and will have no foundry iron to offer for prompt delivery for several weeks. Southern iron is weak and inactive. We note the sale of 500 tons of No. 3 for the last-half shipment to Canada, at $12.75, Birmingham. No. 2 Southern is now quoted at $13.25, Birmingham, for the last half and can doubtless be bought at $13 for shipment to July 1. For prompt shipment and for the first half, we quote, delivered Cleveland, as follows:

Bessemer	$18.15
Basic	$17.00 to 17.25
Northern No. 2 foundry	17.00 to 17.25
Southern No. 2 foundry	17.35 to 17.60
Gray forge	16.75 to 17.00
Jackson County silvery, 8 per cent. silicon	20.55 to 21.55

Finished Iron and Steel.—The demand continues heavy. Apparently the only change in the situation is a slight falling off in premium business for quick delivery. The price situation is very firm. One leading independent interest is booking last-half contracts and has taken on considerable tonnage for that delivery at 1.40c. for steel bars and 1.50c. for plates and structural material. The warehouse demand is heavy and jobbers' stocks are in as bad condition as at any time. The demand for structural material has become more active than at any time since last summer. The Forest City Steel & Iron Company has taken 1000 tons for a new building for the Cleveland Foundry Company. The American Bridge Company will furnish 1050 tons for extensions to the Cuyahoga Works, Cleveland, of the American Steel & Wire Company. The McMyler Interstate Company has taken 150 tons for a new building for the Thew Automatic Shovel Company, Lorain. The Metzger & Wells Company, Philadelphia, was low bidder on a group of hospital buildings, to be erected by the city of Cleveland, that require about 1000 tons. Among new inquiries pending is one from the Lake Shore Railroad for 2000 tons of structural material for bridge work and another for 2500 tons for a new hotel in Grand Rapids, Mich. The Lackawanna Steel Company has taken 600 tons of standard rails for the Toledo Railway & Light Company. This company has an inquiry out for 1700 tons, but the remainder of the order will not be placed at present. In addition to the girder rails bought by the Cleveland Railway Company, noted last week, this company has placed an order with the Lackawanna Steel Company for 500 tons of standard rails. Sheets continue in good demand. There is also some good buying of tin plate. The demand for bolts and nuts is heavy and mills are behind on deliveries. Bar iron is fairly active, with quotations unchanged at 1.65c. to 1.70c., Cleveland. Jobbers' prices are 2.10c. for steel bars out of stock and 2.25c. for plates and structural material.

Old Material.—The market shows little change. There is only a limited demand and prices are not firm. In most grades the decline seems to be arrested and sellers believe that prices have about touched bottom. Dealers generally are asking $6.50 for turnings, which are weak and have been quoted at lower prices. Borings, for which there has been a good demand, are firmer. Bundled sheet scrap is weaker. The only inquiries are for small lots. The Lake Shore Railroad will close on its list March 14. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	$14.50 to $15.00
Old iron rails	16.00 to 16.50
Steel car axles	18.75 to 19.25
Heavy melting steel	12.75 to 13.00
Old carwheels	15.00 to 15.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.50 to 14.00
Light bundled sheet scrap	11.00 to 11.50

Per Net Ton.

Iron car axles	$21.00 to $21.50
Cast borings	7.00 to 7.50
Iron and steel turnings and drillings	6.25 to 6.50
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.50 to 12.00
No. 1 railroad wrought	13.50 to 14.00
No. 1 cast	12.50 to 13.00
Stove plate	10.00 to 10.50
Bundled tin scrap	11.00 to 11.50

Coke.—The market is very dull, but prices are being well maintained. The only demand is for small lots of foundry grades. Connellsville furnace coke is quoted at $2.50 per net ton at oven for prompt shipment and $2.50 to $2.75 for contract. Good brands of 72-hr. foundry coke are held at $3.50 for prompt shipment and contract.

Cincinnati

CINCINNATI, OHIO, March 11, 1913.

Pig Iron.—The market continues abnormally quiet for the season. This condition may be attributed almost entirely to the hesitancy of buyers to cover for last-half requirements. In March there is usually heavy contracting for forward delivery, but just now melters are not disposed to cover for more than immediate needs. It is the opinion of local pig-iron merchants that the test of the market will not come until some of the larger buyers endeavor to cover their future wants. Although the quantity of resale iron now offering is more limited, holders of it, as is usually the case when prices are weak, have made concessions that have had some effect on regular furnace quotations. For prompt shipment $13, Birmingham basis, is now being quoted for nearby shipment, and it is also conceded that $16, Ironton, is being done. However, the majority of furnaces in both districts are holding out for 25c. to 50c. a ton above the figures named. Many of these producers are pressed for delivery on previous contracts, and are not disposed to make concessions at present. A Canadian melter booked 500 tons of Southern No. 3 foundry, through a local agency, at $12.75, Birmingham, for last-half shipment. A like quantity of the same grade of iron was taken by a central Ohio company at the same price, for April-June movement, and a Michigan melter took 250 tons of Southern No. 3 foundry at $13, Birmingham, for shipment in the third quarter. Inquiries are scarce, and it is generally understood that where any large tonnage is asked for sellers are somewhat skeptical as to the serious intention of the buyer further than feeling the market. Malleable and basic are as quiet as foundry iron. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	$16.75 to $17.25
Southern coke, No. 2 foundry and 2 soft	16.25 to 16.75
Southern coke, No. 3 foundry	16.00 to 16.25
Southern, No. 4 foundry	15.75 to 16.00
Southern gray forge	15.50 to 15.75
Ohio silvery, 8 per cent. silicon	20.70 to 21.20
Southern Ohio coke, No. 1	17.70 to 18.20
Southern Ohio coke, No. 2	17.20 to 17.70
Southern Ohio coke, No. 3	16.95 to 17.20
Southern Ohio malleable Bessemer	17.20 to 17.45
Basic, Northern	17.70 to 18.20
Lake Superior charcoal	19.25 to 19.75
Standard Southern carwheel	27.25 to 27.75

Coke.—The demand for both furnace and foundry coke is still light, but prices are holding fairly well. While there are reports as to 48-hr. coke obtainable in the Connellsville field as low as $2.25 per net ton at oven, this price is not being made on standard brands. The same is true with foundry coke; while $3 can undoubtedly be done on a few of the lower grades, quotations on well-known brands range from $3.25 to $3.75. A fair market quotation on furnace coke would be $2.50 for either prompt or forward delivery. Reports from the Wise County district are somewhat conflicting, and prices on both furnace and foundry coke have softened to some extent. However, the general average in the Connellsville field will about represent what users are paying in both the Wise County and Pocahontas districts.

Finished Material.—The question of making shipments on contract time is yet worrying all mill agencies. The local sheet mill is about 12 weeks behind on orders. New business is falling off in some quarters, but the opening of spring will bring out a larger demand for all kinds of structural material as well as railroad track supplies. The local warehouses are also unable to fill orders promptly on many different kinds of structural material, and contractors frequently offer a premium to hurry forward shipments, but in many cases this is impossible to accomplish. We continue our quotations of 1.45c., Pittsburgh, for steel bars, for prompt shipment, and 1.40c. Pittsburgh basis for forward delivery. Structural shapes run from 1.45c. to 1.50c. Pittsburgh.

Old Material.—Both buyers and sellers have been watching the pig-iron market closely, and prices are very weak. Considerable scrap is being melted, but this is offset by the large offerings, and there does not seem

to be any chance for an early improvement in present quotations. The minimum prices given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum figures are dealers' quotations f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	$10.25 to $10.75
Old iron rails	13.75 to 14.25
Relaying rails, 50 lb. and up	20.75 to 21.25
Rerolling steel rails	12.75 to 13.25
Melting steel rails	10.75 to 11.25
Old carwheels	12.50 to 13.00

Per Net Ton.	
No. 1 railroad wrought	$10.75 to $11.25
Cast borings	6.75 to 7.25
Steel turnings	7.25 to 7.75
No. 1 cast scrap	10.50 to 11.00
Burnt scrap	7.50 to 8.00
Old iron axles	18.00 to 18.50
Locomotive tires (smooth inside)	11.75 to 12.25
Pipes and flues	7.25 to 7.75
Malleable and steel scrap	9.00 to 9.50
Railroad tank and sheet scrap	6.00 to 6.50

Birmingham

BIRMINGHAM, ALA., March 10, 1913.

Pig-Iron.—The market shows no signs of price recuperation. Furnaces generally hold to a minimum of $13.50, with one seller firm at $14 and the leading interest practically out of the market owing to its small production of foundry iron. On the other hand, warrants of one of the large iron makers are offered at $13 for large takings and even that price is reported to have been shaded in actual transactions, the $13 proffer not having induced acceptances of great volume. An Eastern pipe maker bought 3000 tons of furnace iron during the week at price concessions. A pig-iron maker whose product is eagerly sought sold small lots of Nos. 1 and 2 soft and 4 foundry at $14.50, $14 and $13.50 respectively. It has very little No. 2 foundry or soft for second quarter left and will not concede on quotations. The resale iron does not represent the furnace market, because it is a cash transaction, but the offering of Tennessee furnace iron and that of one Alabama stack at around $13 have a persistent effect upon the trade at large. It is reported that inquiries are more brisk than they have been in some time. Carload lots handled by brokers and purchased from furnaces have ruled not under $13.50 per ton. It is certain that the furnace interests will continue as a rule to quote at least 50c. over the lowest offerings of resale iron and will not quote as low as the Tennessee furnace stacks unless the market grows still weaker. February production, like that of March, was in excess of any prior output for that month. Oxmoor stack of the Tennessee Company has not yet gone into blast and it is understood that the new Woodward furnace will not be operated until the additions to the by-product coke plant are completed. Shipments have been heavy, and accumulations on yards are reported as stationary. Taking resale iron as one base and furnace iron as another, and also bearing in mind that one furnace company is offering nothing under $14 while another is meeting the resale price, quotations f. o. b. cars at Birmingham are as follows:

No. 1 foundry and soft	$13.50 to $14.00
No. 2 foundry and soft	13.00 to 13.50
No. 3 foundry	12.50 to 13.00
No. 4 foundry	12.25 to 12.75
Gray forge	12.00 to 12.50
Basic	13.00 to 13.50
Charcoal	25.00 to 25.50

Coal and Coke.—Coke is in firm demand and prices continue to rule strong. Good foundry coke sells at $3.50 per net ton at oven, while some grades range from $3.75 to as high as $4.25. One 1000-ton order has been received from California and Mexican inquiries are in the market. Work is progressing on additions to the Semet-Solvay plant at the furnace of the Central Iron Company at Holt and to the Koppers by-product plant at the Woodward furnaces. Coal is in good demand, but the approach of warmer weather is making operators anxious to book contracts for future delivery. Efforts to increase domestic and bunker business at New Orleans, Mobile and Pensacola are meeting with success. Two large concerns are preparing to convey Alabama coal to Mobile and New Orleans from Tuscaloosa as a base.

Old Material.—The market price was shaded the past week and a satisfactory movement from yards ensued. Dealers are busier getting rid of accumulations than in taking on stock. Steel scrap has been well bought, with relaying rails a close second. The latter have been in good demand for a year. Light cast and stove plate are moving slowly, in sympathy with the pig-iron market. Prices f. o. b. dealers' yards are as follows, per gross ton:

Old iron axles	$15.50 to $16.00
Old steel axles	15.50 to 16.00
Old iron rails	14.00 to 14.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	10.50 to 11.00
No. 1 country wrought	10.00 to 10.50
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	10.50 to 11.00
No. 1 steel scrap	11.00 to 11.50
Tram car wheels	11.00 to 11.50
Standard car wheels	12.50 to 13.00
Light cast and stove plates	9.00 to 9.50

Cast-Iron Pipe.—Contract has been let to the F. W. Mark Construction Company for the foundry buildings of the National Cast Iron Pipe Company at Boyles, Ala. The Virginia Bridge & Iron Company will furnish the steel. The water pipe trade is not up to what it was at this time last year. Prices are somewhat weaker. Quotations now are $23.50 per net ton for 4 in. and $21.50 for 6 in. and upward, with $1 added for gas pipe. Waco and El Paso, Texas, are submitting specifications, one for 2000 and the other for 3000 tons. The former is said to have been booked.

St. Louis

ST. LOUIS, MO., March 10, 1913.

The movement of iron and steel continues very large, indeed, much larger than was anticipated when contracts were made, but consumers are keeping persistently out of the market for pig iron, scrap and material which might be regarded as raw material. The rate of consumption seems to indicate that a change must come shortly.

Pig Iron.—If anything, pig iron is lower than it was last week, though the quotations do not show any very material change. An order of considerable size could be filled below the market quotation quite easily. Representatives declare this state of affairs to be due to the presence of considerable resale iron. The reports of heavy production by the furnaces is also encouraging consumers to hold off. Sales were altogether of the very small lot order, carloads, etc., bought evidently for special purposes. There are inquiries out for 150 tons of 4 to 5 per cent. silicon and for 1000 tons of charcoal iron for eastern delivery; also for prices for a number of small lots, but no lots upon which a market quotation could be generally based. The quotations are $13.25 to $13.75 for No. 2 Southern, Birmingham basis, but $13 would get the iron, especially if it could be taken a little high in phosphorus. Ohio iron No. 2, Ironton basis, ranges from $16 to $16.50 and Chicago No. 2X is steady at $17.50 and the furnaces are reported to be getting the price.

Coke.—There is a little stiffening in coke. No sales were reported of consequence, but the shipments continue large, showing that the quantities previously contracted for are going rapidly into consumption. By-product coke is quotable on the Connellsville basis. Furnace coke stands at last week's figures.

Finished Iron and Steel.—In finished products there was a slight recession in inquiries, but the aggregate of orders was still of heavy amount. Movement forward under contract continues as fast as the mills can turn the material out and get the cars therefor, and consumers are as anxious as ever to get their allotments. This condition especially applies to structural material and bars. Fabricating shops are among the most insistent in getting their material in preparation for spring work, as well as to keep up with the work which the open winter has made possible. The agricultural implement lines are busier than ever and the wagon industry is also maintaining its activity. In standard section rails there has been nothing doing, and the light rail demand has let up somewhat, though the lumber roads are quite busy. The coal interests are practically out of the market until time comes for their summer preparations for the winter. About all the lumber requirements, however, have been filled for the present. Plates show no change. Track fastenings are quiet.

Old Material.—Quotations are fairly well held at the figures given, but no new business is appearing, the mills having continued in their attitude of waiting for price recessions to reach the lowest level. Few buyers are appearing except those who are looking for some especially attractive lot to snap up. In addition to the attitude of the mills, the open winter has enabled the railroads to pick up considerably more scrap than was anticipated and this has helped to keep the market down. The Wabash came out with 1500 tons closing late to-day, and the Mobile also offered 900 tons closing

to-morrow, while a number of small lots were also presented by other roads. We quote dealers' prices, f.o.b. St. Louis, as follows:

	Per Gross Ton.	
Old iron rails	$13.00 to	$13.50
Old steel rails, rerolling	14.00 to	14.50
Old steel rails, less than 3 ft.	12.00 to	12.50
Relaying rails, standard section, subject to inspection	22.50 to	23.50
Old carwheels	15.00 to	15.50
Heavy melting steel scrap	12.00 to	12.50
Frogs, switches and guards, cut apart	11.50 to	12.00
	Per Net Ton.	
Iron fish plates	$11.50 to	$12.00
Iron car axles	19.50 to	20.00
Steel car axles	17.00 to	17.50
No. 1 railroad wrought	11.25 to	11.75
No. 2 railroad wrought	11.00 to	11.50
Railway springs	10.00 to	10.50
Locomotive tires, smooth	11.50 to	12.00
No. 1 dealers' forge	8.50 to	9.00
Mixed borings	6.50 to	7.00
No. 1 busheling	10.50 to	11.00
No. 1 boilers, cut to sheets and rings	7.50 to	8.00
No. 1 cast scrap	10.50 to	11.00
Stove plate and light cast scrap	8.00 to	8.50
Railroad malleable	9.75 to	10.25
Agricultural malleable	8.00 to	8.50
Pipes and flues	7.00 to	7.50
Railroad sheet and tank scrap	6.50 to	7.00
Railroad grate bars	7.50 to	8.00
Machine shop turnings	7.50 to	8.00
Bundled sheet scrap	6.75 to	7.25
Wrought arch bars and transoms	14.00 to	14.50
Steel couplers and knuckles	10.00 to	10.50

Boston

BOSTON, MASS., March 11, 1913.

Old Material.—The week has seen an important improvement in the demand for heavy melting steel, the mills having entered the market in a large way. Their stocks of scrap have got low and in some cases they are urging immediate deliveries. The price has advanced about $1. In fact recent sales have been so few that quotations have been largely nominal, pending a buying movement which would determine the actual status of the market. As to cast scrap the sentiment is better, with no change in prices. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$11.50 to	$11.75
Low phosphorus steel	13.50 to	14.50
Old steel axles	14.50 to	15.00
Old iron axles	22.50 to	23.00
Mixed shafting	13.50 to	13.75
No. 1 wrought and soft steel	10.75 to	11.00
Skeleton (bundled)	9.00 to	9.50
Wrought-iron pipe	10.00 to	10.25
Cotton ties (bundled)	9.50 to	9.75
No. 2 light	4.00 to	4.50
Wrought turnings	7.50 to	7.75
Cast borings	7.50 to	7.75
Machinery, cast	13.50 to	14.00
Malleable	10.50 to	11.00
Stove plate	8.50 to	9.00
Grate bars	7.50 to	7.75
Cast-iron carwheels	15.00 to	15.50

Buffalo

BUFFALO, N. Y., March 11, 1913.

Pig Iron.—Inquiry and sales have been exceedingly light, transactions being so limited as not to furnish a very accurate basis for a price schedule. Lack of inquiry and buying has had a tendency to lower the tone of the price situation and make it a buyers' market. We have therefore adjusted our schedule to show the following range of prices f.o.b. Buffalo for second quarter and last half delivery:

No. 1 foundry	$16.75 to	$17.25
No. 2 X foundry	16.50 to	17.00
No. 2 plain	16.50 to	16.75
No. 3 foundry	16.25 to	16.50
Gray forge	16.00 to	16.25
Malleable	17.00 to	17.25
Basic	17.50 to	18.00
Charcoal, regular grades and analysis	18.00 to	19.00
Charcoal, special brands and analysis		21.75

Finished Iron and Steel.—Some of the mills and agencies are now booked fully for the remainder of the year and are not even in a position to accept additional business for delivery in the fourth quarter. Other mills are taking business from old established customers with the understanding that deliveries can be guaranteed during that period. As nearly as can be learned there is very little steel that can be bought for shipment short of the last quarter of the year, except at a premium from some of the smaller eastern mills. The principal local producer is sold up to the end of the fourth quarter in bars, plates and shapes, and is in consequence obliged to turn down new business in these lines at the present time, but this does not apply to rails or sheet steel piling. The demand for bar iron is good at 1.65c. for carloads and 1.70c for less, Pittsburgh base. It is generally reported that actual orders in the way of specifications against contracts for the month of February were in excess of mill shipments and specifications are continuing to come in in large volume so that there is no improvement in delivery. The demand for railroad repair material remains exceedingly active and deliveries on track supplies, spikes, bolts, etc., are becoming more extended. Business in fabricated structural lines is very brisk with prospects of increasing demand as spring advances, architects' offices being unusually busy on new building projects. Bids go in this week for the Hamot Hospital, Erie, Pa., requiring 300 tons; also for a school building at Sloan, N. Y., a suburb of Buffalo, for 100 tons. The Bison Construction Company, Buffalo, will build a meter and valve house for the water works pumping station, this city, taking 250 tons. The Lackawanna Bridge Company, Buffalo, has the contract for an extension of the plant of the American Radiator Company at Bayonne, N. J., 2500 tons; also for 200 tons for a power house on Salmon River and 300 tons for additions to the plant of the Semet-Solvay Company at Cleveland, besides the enlargement for that company recently reported. The McClintic-Marshall Construction Company has the steel contract for the tube mill addition for the Rome Mfg. Company, Rome, N. Y., and the steel contract for the Morrow Mfg. Company, Elmira, N. Y., 300 x 300 ft. in size.

Old Material.—The market is extremely quiet, with no large movements in any line, with the exception of heavy melting steel which is comparatively active. Turnings are a drug in the market and there has been a decided drop in the price. The price schedule for the week per gross ton, f.o.b. Buffalo, is as follows:

Heavy melting steel	$14.00 to	$14.50
Boiler plate, sheared	15.50 to	16.00
No. 1 busheling scrap	11.50 to	12.00
No. 2 busheling scrap	9.50 to	10.00
Low phosphorus steel	17.00 to	17.50
Old iron rails	15.00 to	15.50
No. 1 railroad wrought	14.00 to	14.50
No. 1 railroad and machinery cast scrap	13.75 to	14.25
Old steel axles	17.00 to	17.50
Old iron axles	24.00 to	24.50
Old carwheels	15.75 to	16.25
Railroad malleable	13.25 to	13.75
Locomotive grate bars	11.00 to	11.50
Stove plate (net ton)	9.75 to	10.00
Wrought pipe	10.00 to	10.50
Wrought-iron and soft steel turnings	7.50 to	8.00
Clean cast borings	7.50 to	8.00
Bundled tin scrap		18.00

New York

NEW YORK, March 12, 1913.

Pig-Iron.—Sellers of pig-iron agree that there is more inquiry but it does not appear that actual business has increased. Some of those who have now asked for prices also did so a month or more ago. It remains to be seen whether they mean business now. It is not easy to say just what the market is. If there is the buying which some predict who are watching developments closely, it is likely to be at prices somewhat below what has been considered the market recently. The particular matter of speculation is whether the volume will be sufficient to lift prices—even to cause a recovery to the level of December. Some inquiry for basic iron is reported in eastern Pennsylvania and one sale in the Harrisburg district. The New England market is quiet after recent considerable buying by one interest. Contrary to what is reported in the Central West, where it is believed foundries will need quite a little more iron for the second quarter, Eastern melters are fairly well covered to the middle of the year. We quote as follows for Northern iron at tidewater: No. 1 foundry, $17.75 to $18.25; No. 2 X, $17.50 to $17.75; No. 2 plain, $17.25 to $17.75. Southern iron is quoted at $17.75 to $18.25 for No. 1 foundry and $17.50 to $17.75 for No. 2.

Structural Material.—Quite a number of awards have been made since the last report and considerable structural work for manufacturing buildings, power houses and other developments of the investment as distinguished from the speculative sort is being figured. Relatively prompt shipment is somewhat easier, but the same scale applies, namely, 1.60c. Pittsburgh basis delivered in four to twelve weeks, depending on the size,

etc. It seems likely that little premium business now is done between this price and jobber's store prices. The conspicuous letting of the week is the 7500-ton structure for the Lord & Taylor store, awarded to the Hay Foundry & Iron Works for a design incorporating both Bethlehem shapes and cast-iron columns. Some bridge work is credited to the American Bridge Company, including 800 tons for the Boston & Maine, 700 tons for the Buffalo, Rochester & Pittsburgh, 400 tons for the Lehigh & Hudson and 200 tons for the Pennsylvania. Among building contracts may be mentioned the following (which are offered without opportunity to verify), as indicating present activity: 350 tons for a loft on Fifth avenue to the Alfred E. Norton Company; 300 tons for a building on Eleventh avenue at Twenty-eighth street to Levering & Garrigues Company, and 375 tons for the Boston Insurance Company's building to the New England Structural Company. Advertising for some more of the subway work and elevated extensions in that connection, now practically all authorized, has not yet appeared. A large project depending, it appears, on acceptance by the Connecticut Legislature of the present railroad bridge for highway purposes, is a new four-track bridge for the New Haven over the Thames River. J. G. White & Co., New York, are asking for bids on power houses, one at Augusta, Ga., and one at Parr, S. C., each involving about 300 tons. The Pennsylvania Steel Company is to supply about 3300 tons of the fabricated bridge material for the Norfolk & Western mentioned recently in this column. Quotations for plain material are: 1.61c. to 1.66c. New York, for delivery in third quarter; 1.76c. New York, for delivery in 4 to 12 weeks; 2.15c. from store.

Plates.—Demand has improved, as eastern Pennsylvania mills require four or more weeks for delivery, with the sheared product in the greater demand. Plate mills look for a continuance of business at the present rate for some time. Car buying, however, has not brightened and not much is looked for in the next week or ten days. The Boston & Maine is now asking for 6000 instead of 5000 cars and to inquiries already reported in this column may be added 1000 stock cars for the Missouri, Kansas & Texas. Bids have gone in for the 600 cars for the Havana Central. The New York, Susquehanna & Western has bought 500 box cars of the Western Steel Car & Foundry Company and the Buffalo, Rochester & Pittsburgh some 22 passenger cars of the Pullman Company. Quotations remain 1.61c. to 1.66c. New York, for mill shipments in the third quarter and 1.76c. for shipment in four weeks, with $1 a ton additional for universal plates.

Bars.—Premium business has not at all disappeared and specifications on contracts are keeping up. The remarkable point about the latter situation is that while heavy specifying was to be expected in late 1912, owing to the lower prices at which contracts were closed, the heavy specifying continues at the new price levels well in advance of the periods of rolling. Considerable of the inquiry in the way of new business offered to mills' representatives appears to be material which the buyer has been unable to place with the mills he usually deals with. One independent mill, it is learned, is making a practice of hunting customers periodically who are likely to have some urgent need, and it lately, for example, sold about two carloads for immediate rolling and shipment in two or three days at 2c. Pittsburgh. Bar iron orders continue in good volume and quotations are reported firm. Steel bars are quoted at 1.56c. New York, delivered at the convenience of the mill, which is commonly more than three months hence, with reinforcing bars perhaps easier to get than others. Refined iron bars are still quoted at 1.70c. to 1.80c., New York. Store prices are: steel bars 2.05c.; iron bars, 2.10c.

Cast-Iron Pipe.—Asbury Park, N. J., will open bids March 17 for a pipe-laying contract which will involve the purchase by the successful bidder of 3300 tons. This appears to be the only early public letting of importance in this immediate vicinity. Private buying is perhaps slightly better than usual for the season, but is of course very much in excess of the buying of this character a year ago. Carload lots of 6 in. are quoted at $24 to $25, per net ton, tidewater.

Old Material.—A better feeling prevails among dealers. A number of steel companies in eastern Pennsylvania appear to have found it necessary to replenish their stocks of heavy melting steel scrap and have entered the market for considerable quantities. Some of the dealers in this city were participants in furnishing it, and sales were made up to $13.50, delivered at works in eastern Pennsylvania. A better demand for railroad wrought scrap was also experienced and this class of scrap on railroad lists was quite readily absorbed by rolling mills, dealers being unable to secure much of the offerings even at bids equivalent to $15.50 to $15.75, eastern Pennsylvania. The developments of the past few days would seem to indicate that prices had been forced to a lower point than holders were willing to accept for more than small lots. The steel works and rolling mills are steadily consuming large quantities of scrap and cannot continue out of the market for any considerable time. Cast scrap has not felt the influence of a better demand, but it is believed that a buying movement may be seen in that direction in the near future. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	$10.50 to $11.00
Heavy melting steel scrap	10.50 to 11.00
Relaying rails	22.00 to 22.50
Rerolling rails (nominal)	14.00 to 14.50
Iron car axles	24.00 to 24.50
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	13.25 to 13.75
Wrought-iron track scrap	12.75 to 13.25
No. 1 yard wrought, long	11.50 to 12.00
No. 1 yard wrought, short	10.50 to 11.00
Light iron (nominal)	4.50 to 5.00
Cast borings	7.25 to 7.75
Wrought turnings	7.50 to 8.00
Wrought pipe	9.75 to 10.25
Old carwheels	14.00 to 14.50
No. 1 heavy cast, broken up	11.25 to 11.75
Stove plate	8.75 to 9.25
Locomotive grate bars	8.00 to 8.50
Malleable cast	11.00 to 11.50

Ferroalloys.—The market for 80 per cent. ferromanganese is without change at $65, Baltimore, for all deliveries. The inquiry for 150 tons previously referred to is still pending and a few sales of carload lots have been made, but the market otherwise is quiet. Ferrosilicon is unchanged at $75, Pittsburgh, for carloads, $74 for 100 tons and $73 for 600 tons and over.

The American Iron & Steel Mfg. Company has moved its New York offices to larger quarters in the Whitehall building, 17 Battery place. Its suite is on the nineteenth floor in the new portion of the building.

The Debevoise-Anderson Company, 95 Liberty street, New York, announces that William J. Jegen has become associated with the business, and will have charge of the bituminous coal sales.

British Buying Strictly Limited

European Financial and Political Position Creates Hesitation

(*By Cable.*)

MIDDLESBROUGH, ENGLAND, March 11, 1913.

All markets are unsettled. The European financial and political position is not liked and is creating hesitation. Buying of all kinds of materials is strictly limited. Stocks of warrant iron are 217,374 tons, against 218,633 tons a week ago. We quote as follows:

Cleveland pig-iron warrants (closing Tuesday), 62s. 10½d., against 63s. 6d., one week ago.

No. 3 Cleveland pig iron makers' price, f.o.b. Middlesbrough, 63s. 6d., against 64s., one week ago.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 10s.

German sheet bars, f.o.b. Antwerp, 112s. 6d.

German 2-in. billets, f.o.b. Antwerp, 107s. 6d.

German basic steel bars, f.o.b. Antwerp, £5 17s., a decline of 1s.

Steel bars, export, f.o.b. Clyde, £8, a decline of 5s.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 7s. 6d.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yards, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 1½d., unchanged from last week, against 14s. 3d. two weeks ago.

The Wagner Electric Mfg. Company, St. Louis, has elected these officers: President and general manager, W. A. Layman; vice-president, J. A. Bell; secretary, Albert Blair; treasurer and assistant secretary, W. S. Thomas; M. S. Allcorn, assistant secretary; Walter Robbins, assistant general manager. The directors are James A. Bell, W. K. Bixby, Albert Blair, James W. Buick, James Campbell, W. A. Layman and Thomas H. West.

Metal Market

NEW YORK, March 12, 1913.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Mar.	Lake.	Electro-lytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
6	15.00	14.87½	47.60	4.35	4.20	6.35	6.20
7	15.12½	14.87½	47.10	4.35	4.20	6.35	6.20
8	15.12½	15.00	.....	4.35	4.20	6.35	6.20
10	15.12½	15.00	46.35	4.35	4.20	6.40	6.25
11	15.12½	15.00	46.45	4.35	4.20	6.40	6.25
12	15.12½	15.00	46.60	4.35	4.20	6.40	6.25

Copper is higher, following good buying by domestic consumers. Tin is lower, with futures fairly active. Lead is a little stronger, but dull. Spelter shows improvement in demand and price. Antimony is lower and the market soft.

New York

Copper.—The February statement of the Copper Producers' Association, showing a decrease in stocks of nearly 900,000 lb., was favorably regarded in this country if not altogether so in Europe and there ensued on the afternoon of March 7, the day the statement was issued, considerable activity in buying on the part of domestic consumers. The movement lasted into Saturday and all told a large quantity of copper was taken, most of it for fairly early delivery. Despite such buying there probably is a good amount of April metal yet to be bought. The activity of Friday and Saturday brought about an advance of ⅛c., making the price of Lake copper 15.12½c. and of electrolytic 15c., cash New York. Calumet & Hecla metal was advanced to 15.25c. and some business was done at this figure, but there is still enough Lake copper to be had at 15.12½c. to establish a market price. The conditions following the appearance of the producer's statement duplicated those of the month before in that there was a good total of domestic sales, but Europe failed to respond. The stringency of money and continued unsettled political conditions abroad are held responsible for the restraint shown by European consumers. Spot copper is quoted in London to-day at £65 2s. 6d. and futures at £65 15s. The exports this month have amounted to 15,573 tons, but not all of that sent abroad is going into consumption, according to various authorities, but is being held in reserve.

Pig Tin.—For prompt delivery this metal has been in poor demand, but in futures there has been a fair, steady business, although no very large quantities have been bought singly. Nearly all of this business, and also what there has been in spot tin, have been at concessions below the import cost. About the only explanation of the situation is the pessimistic feeling prevailing abroad which has caused continued short selling by bear operators in London. As a result it will require a great deal of tin to cover the short interests when contracts are due. In this market there will be plenty of tin for March consumption and a fair sized surplus will be left. Tin is quoted in New York to-day at 46.60c. and quotations in London are £212 15s. for spot and £209 5s. for futures. Arrivals this month total 2095 tons and there is afloat 3430 tons.

Lead.—The market is a little stronger at unchanged prices, but is dull. One of the influences holding up the price of lead is the small difference between production and consumption, which is so narrow that were it not for prospective tariff changes considerably higher prices might be expected. The price in New York is 4.35c. and in St. Louis, 4.20c.

Spelter.—There is an improvement shown in this metal, the price of which was advanced five points early this week. The demand is good. The New York price is 6.40c. and that in St. Louis, 6.25c.

Old Metals.—With a fair demand, dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	14.25 to 14.50
Copper, heavy and wire	13.75 to 14.00
Copper, light and bottoms	12.75 to 13.00
Brass, heavy	9.25 to 9.50
Brass, light	7.75 to 8.00
Heavy machine composition	12.75 to 13.00
Clean brass turnings	8.50 to 8.75
Composition turnings	11.00 to 12.00
Lead, heavy	4.00
Lead, tea	3.75
Zinc, scrap	5.25

Antimony.—Prices range lower for all brands, Cookson's now being quoted at 9c., Hallett's at 8.50c. and Chinese and Hungarian grades at 7.62½c. The market is soft mainly because of the heavy arrivals, a large part of which are being shipped against contracts entered during the heavy buying movement which began in full force last November. The arrivals are so heavy, it is asserted, that the market is over supplied, particularly with the cheaper grades.

Chicago

MARCH 11.—The general acceptance that the short month was the cause of reduced copper stocks in February has discounted somewhat the strength that this announcement might otherwise have given to the market and quotations are accordingly unchanged. Tin prices declined, but the spelter situation, which has been decidedly weak, appears to have gathered some strength. We quote as follows: Casting copper, 15c.; Lake, 15.50c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 47.50c., small lots, 49.50c.; lead, desilverized, 4.30c. to 4.35c. for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.25c. to 6.30c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc is $8.25, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 13c.; copper bottoms, 11.75c.; copper clips, 12.75c.; red brass, 12c.; yellow brass, 9c.; lead pipe, 3.80c.; zinc, 4.50c.; pewter, No. 1, 33c.; tinfoil, 37c.; block tin pipe, 44c.

St. Louis

MARCH 10.—Quotations of to-day, which follow, were fairly well held: Lead, 4.20c. to 4.22½c.; spelter, 6.25c. to 6.27½c.; tin, 46.60c. to 46.85c.; Lake copper, 15.60c. to 15.72½c.; electrolytic copper, 15.35c. to 15.47½c.; antimony, Cookson's, 9.60c. to 9.75c. In the Joplin ore market prices moved upward on some qualities. The range of the basis price for 60 per cent. zinc blende was $48 to $49 per ton, a material strengthening in the lower grades, while the choicest lots brought as high as $52. Smelters all seemed anxious to buy and the heavy purchases practically cleaned out the reserve ore in the bins. Calamine brought, for the very best grades, $33, while the range for 40 per cent. was $24 to $26. Lead ore prices showed no change from the previous week, the best figure for high assay ore being $54, with the range for 80 per cent. $52 to $53.50. We quote miscellaneous scrap metals as follows: Light brass, 5.50c.; heavy brass and light copper, 9c.; heavy copper and copper wire, 11c.; zinc, 4c.; lead, 3.50c.; tea lead, 3c.; pewter, 25c.; tinfoil, 34c.

Iron and Industrial Stocks

NEW YORK, March 12, 1913.

Securities have been depressed again by unsettled political and financial conditions in Europe, which had an immediate effect on speculative sentiment in this country. Prices receded quite sharply on Monday of this week. A noteworthy exception was Bethlehem Steel, which advanced on the declaration of a dividend. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.	31 - 35⅛	Pressed Steel, com.	26½ - 28½
Am. Can, pref.	120½-123½	Pressed Steel, pref.	98
Am. Car & Fdy., com.	49½ - 52¾	Railway Spring, com.	27¾ - 27⅞
Am. Car & Fdy., pref.	117	Railway Spring, pref.	100
Am. Loco., com.	35⅛ - 37	Republic, com.	24½ - 25⅝
Am. Loco., pref.	105¼-105¾	Republic, pref.	85½ - 88
Am. Steel Foundries	33½ - 35	Rumely Co., com.	66 - 68
Bald. Loco., com.	46½ - 48½	Rumely Co., pref.	91 - 92
Bald. Loco., pref.	103¾-104½	Sloss, com.	34½
Beth. Steel, com.	35 - 37¾	Pipe, com.	13¾ - 14
Beth. Steel, pref.	66 - 69¾	Pipe, pref.	54
Case (J. I.), pref.	100 -101½	U. S. Steel, com.	58¼ - 62⅞
Colorado Fuel	32 - 35¾	U. S. Steel, pref.	107¾-108¾
Deere & Co., pref.	98¼ - 98⅞	Va. I. C. & Coke	48
Emer-Brant, com.	54 - 56	Westinghouse Elec.	67½ - 70½
General Electric	137⅛-140	Am. Ship, com.	50
Gr. N. Ore Cert.	33¾ - 36	Am. Ship, pref.	100 -101
Int. Harvester, com.	106 -107	Chic. Pneu. Tool	49¼ - 50
Int. Harvester, new	106¼-108	Cambria Steel	50 - 52⅞
Int. Harvester, pref.	111½	Lake Sup. Corp.	26¾ - 27¼
Int. Harvester, Corp.	107	Pa. Steel, pref.	92 - 92½
Int. Pump, com.	10 - 13	Crucible Steel, com.	16⅛ - 16⅜
Int. Pump, pref.	43 - 53¾	Crucible Steel, pref.	93½ - 94
Lackawanna Steel	45	Harb.-Wk. Ref., pref.	102½
Nat. En. & St., com.	13¾ - 16	La Belle Iron, pref.	124
Nat. En. & St., pref.	87 - 87½		

Dividends Declared

The Canadian-Westinghouse Company, Ltd., regular quarterly, 1¾ per cent., payable April 10.

The M. Rumely Company, regular quarterly, 1¼ per cent. on the preferred stock, payable April 1.

The La Belle Iron Works, regular quarterly, 2 per cent., on the preferred stock, payable March 31, and ½ of 1 per cent. on the common, payable April 30.

The Taylor-Wharton Iron & Steel Company, regular semi-annual, 3 per cent. on the common stock, payable April 1.

The Cambria Iron Company, regular semi-annual, 2 per cent., payable April 1.

The Bethlehem Steel Corporation, 5 per cent. out of earnings for the year 1912, payable quarterly. The first 1¼ per cent. is payable April 25. This is the first dividend declared since 1907.

The Youngstown Sheet & Tube Company, regular quarterly, 1¾ per cent. on the preferred stock and 2 per cent. on the common stock.

Personal

Arthur G. Trimble, formerly with the United States Cast Iron Pipe & Foundry Company, at Scottdale, Pa., has resigned to become traffic manager for the Whitney-Kemmerer Company, dealer in pig iron, coal and coke, Oliver Building, Pittsburgh.

W. P. Snyder, president Shenango Furnace Company, Pittsburgh, has returned from Florida.

A. J. Bopp, formerly connected with the West Leechburg Steel Company, West Leechburg, Pa., manufacturer of cold-rolled strip steel, has resigned and is now with the Weirton Steel Company, building a plant at Weirton, W. Va., to make the same product.

J. C. Brown has been appointed manager of sales for the Lebanon Valley Iron & Steel Company, Lebanon, Pa., succeeding J. O. Entrekin, resigned.

Prof. William Kent is to address the Cincinnati section of the American Society of Mechanical Engineers on March 20, on "Engineering and Common Sense."

G. H. Charls, manager of sales of the American Rolling Mill Company, Middletown, Ohio, has left on an extended business trip to South America.

M. R. Ribas, president International Exporting Company, Cincinnati, Ohio, will sail from New Orleans March 24 on a business trip to Cuba. He will later visit Central and South American countries in the interest of his company.

Henry T. Hoag, secretary of the Chamber of Commerce of Connellsville, Pa., has resigned to accept a similar position with the Board of Trade of St. John, New Brunswick, Canada.

George W. Greene, inspecting engineer, 313 Wabash Building, Pittsburgh, has resigned his connection with Hildreth & Co., to accept the appointment of resident manager for Morgan T. Jones & Co., inspecting and consulting engineers, Chicago and New York.

Frank M. Ryan was re-elected president of the International Association of Bridge and Iron Workers at the convention held in Indianapolis last week. He will serve until next September, when a referendum election will be held. Delegates who thought it would be unwise to elect a man with a seven-year sentence hanging over him nominated J. D. Barnes, of San Francisco. Ryan's majority was 20 in a vote of 80.

Henry R. Kent has resigned as vice president of Westinghouse, Church, Kerr & Co., New York City, to take effect March 31. His plan is to go into business for himself, but for the present is to take a rest and may participate in the visit to Germany this summer of the American Society of Mechanical Engineers, of which he is a member. He has been a member of Westinghouse, Church, Kerr & Co. since its organization, 28 years ago, and has been vice-president for something over seven years.

A. C. Overholt, resident manager, and W. R. Hill, assistant resident manager of the United States Cast Iron Pipe & Foundry Company at Scottdale, Pa., have resigned to attend to their private interests. Mr. Overholt was one of the organizers of the company and is a member of the board of directors and a member of the executive board. He is vice-president of the First National Bank of Scottdale, a director of the Scottdale Savings & Trust Company, vice-president of the Lincoln Coal & Coke Company and a trustee of Lafayette College. Mr. Hill, who has been with the company several years, was made assistant manager on the death of his father, J. D. Hill. Mr. Overholt ws presented with a loving cup and Mr. Hill a gold watch on March 5. P. T. Laws has been appointed successor to Mr. Overholt. He has been manager of the company's plants at Addyston, Ohio, and at Anniston and Birmingham, Ala.

James L. Gough, for the past year manager of sales for the E. L. Essley Machinery Company, Chicago, has severed his connection with that company.

Charles G. Smith, president Pittsburgh Emery Wheel Company, Pittsburgh, Pa., gave a short talk before the Chicago Foundrymen's Club, March 8, regarding the need for standardizing safety collars for emery wheels.

William P. Mullane has been appointed assistant superintendent of the Sylvan works of the Republic Iron & Steel Company at Moline, Ill.

William P. Bear, who has been connected with the industrial and power departments of the Westinghouse Electric & Mfg. Company, has been appointed sales engineer with the Sprague Electric Works of the General Electric Company, with offices at Chicago. He will especially interest himself in the electrical installation for large buildings.

A. B. Cooper, Jr., formerly superintendent of the metal department of the Brylgon Steel Casting Company, New Castle, Del., resigned March 1 and has established offices in the Drexel Building, Philadelphia, as a manufacturers' agent, selling iron and steel castings.

I. H. Baker, who has been engaged with the Cleveland office of the Dravo-Doyle Company, has severed that connection, having been appointed Cleveland sales manager of the C. H. Wheeler Mfg. Company, Philadelphia, Pa., Kerr Turbine Company, Wellsville, N. Y.; Wilson-Snyder Centrifugal Pump Company, Pittsburgh, and the feed water heater department of Warren Webster & Company, Camden, N. J. His office will be at 918 Citizens Building, Cleveland, and he will also have an office in the Park Building, Pittsburgh. Mr. Baker is also at the head of a new company just incorporated with a capital stock of $10,000 under the name of the Baker Engineering Company. This company was organized to do construction work and will occupy the same offices.

J. M. Butler, secretary and treasurer of the H. Koppers Company, Chicago, is critically ill with cancer of the stomach.

J. A. Rawlins, of Naylor & Co., New York, sailed last week from Liverpool on his return from a European trip.

Garry Le Van, for some years superintendent of blast furnaces of the La Belle Iron Works, Steubenville, Ohio, has been appointed general manager of the plant, succeeding W. D. Crawford, formerly vice-president and general manager, but now president.

Obituary

JONAS J. PIERCE, Sharpsville, Pa., a pioneer iron manufacturer of the Shenango Valley, died suddenly March 4, aged 73 years. He was a native of New Hampshire. In 1847 the family settled in Clarksville and later removed to Mt. Hickory, Mercer County. On the outbreak of the Civil War he enlisted in the Sixty-third Regiment, Pennsylvania Volunteers, participated in important engagements, and was promoted to lieutenant and later to captain. Resigning his commission in 1862, he located in Sharpsville, where he entered the iron business. In 1870 he entered into partnership with George D. Kelly and built two blast furnaces which were operated for years, eventually disposing of them to the Shenango Furnace Company. He was a member of the Pennsylvania State Forestry Commission and filled local public offices. He leaves a widow and five children.

WILLIAM H. SWITZER, general manager of the Salisbury Steel & Iron Company, miner of iron ore, died at his home in Salisbury, N. Y., March 5, aged 57 years. He was born at Little Falls, N. Y., served an apprenticeship in tinsmithing, was in the warming and ventilating business for himself from 1876 to 1884, manager for the Superior Furnace Company, Little Falls, from 1888 to 1895 and afterward president of the Utica Heater Company. He became interested in iron mining about ten years ago.

JOHN MITCHELL CLARK, senior member of the firm of Naylor & Co., 45 Wall street, New York, died March 9 on board the North German Lloyd steamer Grosser Kurfuerst, at Port of Spain, Trinidad. Mr. Clark was a son of the late Rev. Dr. Thomas March Clark, Episcopal Bishop of Rhode Island. He was born in Boston, July 3, 1847, and graduated from Brown University in 1865. He then entered the employ of Naylor & Co., dealers in

iron and steel, in their Boston office. He was admitted as a partner in 1884, when he removed to New York, and since that time has been the senior partner in New York. He was also president of the Berkshire Iron Works, operating a blast furnace at Sheridan, Pa., and was president of the American Grondal Company, which has the American rights for the briquetting of iron ore by the Grondal process. He was married to Mrs. Sarah Wood in London in 1900. Mr. and Mrs. Clark had been at their home in Madison, Fla., since early January and on February boarded the Grosser Kurfuerst at Havana for a cruise in West Indian waters.

RICHARD F. HAWKINS, Springfield, Mass., widely known as a builder of bridges, died March 5, aged 76 years. A native of Lowell, Mass., he passed practically all his life in Springfield. Starting as an office boy with Stone & Harris, bridge builders, he was made a partner in 1862, at the age of 25, the firm becoming Harris, Briggs & Co. Soon afterward the name became Harris & Hawkins. In 1867 Mr. Hawkins assumed the entire ownership and changed the name to R. F. Hawkins Iron Works. William Howe, founder of the business, had invented the Howe truss bridges and Mr. Hawkins had the ability to carry on the idea through the beginning of the use of iron and steel in bridge building, and played a prominent part in the development of this branch of engineering. Many important bridges were designed and constructed under his direction, not only in New England but all over the Eastern States. He also manufactured boilers and machinery and did general structural steel work.

FRED. W. HUBBARD, secretary Kilbourne & Jacobs Mfg. Company, and president Sun Mfg. Company, Columbus, Ohio, died suddenly from blood poisoning at his home in that city March 3, aged 50 years. He leaves a widow and four children. He was a member of the Columbus and the Columbus Country clubs and was well known for his deep interest in works of philanthropy.

JAMES MCMILLAN, president of James McMillan & Co., Chicago, manufacturers of furnaces, died March 3, aged 76 years, after an illness of six weeks.

FRANK P. GILLETT, secretary of the Crown Die & Tool Company, died at his home in Chicago February 26. He was the organizer of this company.

GEORGE B. LAMB, vice-president and general manager of the Farrel Foundry & Machine Company, Waterbury, Conn., died February 21, aged 65 years. He had been connected with the company since 1871.

CHARLES H. REID, for some years vice-president and treasurer of the Zug Iron & Steel Company, Pittsburgh, died March 8 at his home in Crafton, Pa., aged 64 years. He was born in Crestline, Ohio, and when a boy went to Pittsburgh, residing there ever since. More than 30 years ago he entered the employ of Zug & Co., Ltd., now the Zug Iron & Steel Company. He leaves a widow, one son and one daughter.

DR. JOHN S. BILLINGS, an author of medical books and works on sanitation, including a monumental treatise on "Heating and Ventilation" published about 30 years ago when little scientific information on this subject was generally available, died March 10 in New York, aged 74 years. He was a surgeon of the United States Army in the civil war, rising to the rank of lieutenant-colonel and deputy surgeon-general. He was professor of hygiene in the University of Pennsylvania from 1893 to 1896 and until lately since then was director of the New York Public Library.

The Apollo Steel Company, Apollo, Pa., is now installing its machinery and expects to have its plant in operation in April. The plant will have six hot sheet mills, four annealing furnaces, two galvanizing pots and corrugating machinery and the product will be black, galvanized and corrugated iron and steel sheets. Electric power will be used exclusively. The company states that its product is being rapidly contracted for and it expects to have the entire output sold for the second quarter of the year by the time the machinery is started, some orders having been entered for third quarter. H. M. Davis, 702 Betz Building, Philadelphia, will be Eastern representative, while the Pittsburgh and Western districts will be taken care of by C. J. Wolfe from the home office at Apollo.

Pittsburgh and Vicinity Business Notes

Cory & Co., Pittsburgh, have taken out a Delaware charter with a capital stock of $50,000 to carry on the business of mechanical engineers and dealers in boilers, engines, etc.

The Pittsburgh Electric Furnace Company, Vanadium Building, Pittsburgh, is taking estimates on machined iron and steel castings and plate work for a 100-ton electric furnace to be erected in Arizona, for the reduction of copper ores. The company has completed the erection of several electric furnaces in Indiana, and is building five furnaces for the Handy & Harman Company, Bridgeport, Conn. The latter are to be used in the reduction of silver ores.

D. F. Nisbet, consulting engineer, First National Bank Building, Pittsburgh, is preparing plans for a steel frame window-glass factory to be erected by Pilkington Brothers, London, England, at Thorold, Canada. Tank furnaces and other interior equipment will be installed by the H. L. Dixon Company, Pittsburgh.

The Seamless Tube & Iron Company, Youngstown, Ohio, has secured about 25 acres of ground near Lowellville, Ohio, on which it is understood that a plant for the manufacture of seamless tubes will be erected, for which plans are now under way.

The Pittsburgh office of the Brown Hoisting Machinery Company has been removed from 510 Frick Building to 822-823 Oliver Building. H. C. Torrence is manager.

The report that the Standard Steel Car Company, Pittsburgh, will build a steel car plant somewhere near the head of the Great Lakes is officially denied.

The Laughlin & Barney Company, Union Bank Building, Pittsburgh, has sold a 10-ton 60-ft. span Case electric traveling crane to the National Metal Molding Company, Corry, Pa.

Westinghouse, Church, Kerr & Co. have opened an office in the Union Bank Building, Pittsburgh, with E. R. Cate manager, as engineers and contractors for the erection of blast furnace and steel works equipment.

F. B. Allen has opened an office in room 517 Park Building, Pittsburgh, and will represent in the Pittsburgh district the C. H. Wheeler Company, manufacturer of condensers, cooling towers and auxiliary apparatus, and the Warren-Webster Company, Camden, N. J., manufacturer of feed water heaters, purifiers, etc.

Molders employed in Pittsburgh and nearby districts have voted to ask for an increase in wages from $3.75 to $4 per day, effective from March 17. In this connection it should be noted that wages of molders in the Pittsburgh district are now and have been for a long time from 50c. to $1 per day higher than are paid by foundries in Erie, Cleveland and other places. On July last the foundry operators in Pittsburgh gave their employees an advance of 25c. per day, putting the minimum day wage rate at $3.75, many employers paying more. The foundry operators in Pittsburgh and vicinity will hold a meeting this week to consider the demand.

A director of the American Rolling Mill Company states that the report that it contemplates building a plant at Johnstown, Pa., is untrue. Any future extensions will be at Middletown, Ohio, where the present plant is situated. Provision has been made there for the erection of two blast furnaces, but it is not likely that anything will be done in that direction for some time. It uses 7000 to 8000 tons of basic pig iron per month, a good part of which comes from Columbus, Ohio, paying a 90c. freight rate to Middletown.

The Youngstown-Falcon Bronze Company, Youngstown, Ohio, has placed a contract with the Hunter Construction Company of that city, for an addition to its foundry, 40 x 100 ft., and will install some new equipment.

The extensive plant of the Shreve Chair Company, Union City, Pa., was totally destroyed by fire March 8, with a reported loss of $250,000 on buildings and machinery. It is stated the plant will be rebuilt at once.

Herman Bacharach, until recently located at 722 Lewis Block, has moved into larger quarters at 1009 Hartje Building, Pittsburgh. He has enlarged the number of his specialties in scientific and industrial instruments. Besides

indicating and recording steam and gas apparatus, he has taken up some new lines of instruments, among others smoke and dust recorders, specific gravity meters for gas and liquid, carbon dioxide recorders and engine indicators, with automatic efficiency reckoner, etc.

The Westinghouse Machine Company booked orders aggregating $1,100,000 in February, and its shops at East Pittsburgh are more crowded than they have been for a long time, while pending negotiations promise still more business. This company is now able to turn out steam turbines of a capacity of 30,000 hp. Its product has been developed to include the manufacture of a new line, such as steam pumps, steam condensers and other auxiliary apparatus for power plants. Among contracts recently closed by the company was one from the Havana Electric Railway Company, Havana, Cuba, for apparatus to cost about $500,000, including six turbines, three condensers, boiler feed pumps etc.

The third annual banquet of employees of the Westinghouse interests at Pittsburgh was held in that city on the evening of March 8. The toastmaster was Charles A. Terry of New York, one of the vice-presidents of the Westinghouse Electric & Mfg. Company. The speakers were Robert Garland, one of the councilmen of Pittsburgh; Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric Company; Col. H. G. Prout, vice-president and general manager of the Union Switch & Signal Company; E. A. Craig, Southeastern manager of the Westinghouse Air Brake Company; H. H. Westinghouse, president Westinghouse Traction Brake Company; E. S. McClelland, Westinghouse Machine Company, and E. M. Herr, president Westinghouse Electric Company.

In referring to the rapid progress being made on the new open-hearth steel plant of the Pittsburgh Crucible Steel Company at Midland, Pa., it was stated that the 45-in. blooming mill being installed in this works was of the Mackintosh-Hemphill type. This was an error, as the blooming mill is being built by the United Engineering & Foundry Company, Pittsburgh, and the continuous mill by the Morgan Construction Company, Worcester, Mass.

The Wisconsin Steel Company, South Chicago, Ill., has placed contracts for the building and equipment of the new finishing mills it will build this year. The contract for the roll trains and drives was placed with the United Engineering & Foundry Company, Pittsburgh; for the steel building with the McClintic-Marshall Construction Company, Pittsburgh; for the engine, with the C. & G. Company, Mt. Vernon, Ohio, and for the cranes, with the Alliance Machine Company, Alliance, Ohio.

The William Tod Company, Youngstown, Ohio, has recently added two air furnaces to its foundry, which will considerably increase its melting capacity. It is equipping the foundry to produce sand and chilled rolls, in addition to engine castings and general machinery castings.

E. J. Deckman, 1417 Oliver Building, Pittsburgh, representing the Hoppes Mfg. Company, has sold to the Republic Rubber Company, Youngstown, Ohio, a low pressure steam separator for a 1000-kw. turbine.

The George J. Hagan Company, Peoples' Bank Building, Pittsburgh, has taken out a Pennsylvania charter, with a capital stock of $25,000, and will succeed to the business of George J. Hagan, designing and erecting furnaces for iron and steel works, water sealed continuous gas producers and other iron and steel works construction.

The Bollinger-Andrews Construction Company, Pittsburgh, works at Verona, Pa., has received a contract for a large window glass factory in Yokohama, Japan. There will be a number of steel buildings covered with corrugated galvanized steel, and the plant will be equipped with modern machinery. The plant is to be finished and ready for operation by October.

Tate, Jones & Co., Empire Building, Pittsburgh, builders of fuel oil furnaces, have taken out a Pennsylvania charter, with a capital stock of $200,000, equally divided between preferred and common stock.

The Pittsburgh Roller Bearing Company, Pittsburgh, has taken out a West Virginia charter to manufacture roller bearings and other material. The capital stock is $3,500,000, of which $500 has been subscribed and $50 paid.

The Connellsville Iron Works, Connellsville, Pa., works at New Haven, have completed an order of 160 30-bu. mine cars for the new mines of the Youghiogheny Coal Company, Dawson, Pa.

At the annual meeting of the Pittsburgh Tinware Mfg. Company, North Side, Pittsburgh, the following directors were elected: J. N. Palley, Harry Palley, F. L. Falk, C. J. De Muth and J. Lewis Palley. A dividend of 7 per cent., payable March 15, was declared.

The Central Tube Company on and after March 24 will occupy its new offices in the First National Bank Building, Pittsburgh. Its business in black and galvanized steel pipe and rigid electrical conduit having increased greatly, new and larger quarters have been found necessary. The company will occupy the entire eighteenth floor.

The Pittsburgh Foundrymen's Association

At the monthly meeting of the Pittsburgh Foundrymen's Association, held in the Fort Pitt Hotel on the evening of March 10, it developed that the Government, through the Bureau of Standards and Bureau of Mines, is cooperating with the American Institute of Metals with the object of establishing a new set of standards in alloy practice. It is probable that an experimental brass and bronze foundry will be established at the Arsenal Testing Station, Pittsburgh, and the Bureau of Mines will attempt to determine the melting problem, most suitable furnaces and best fuel to be used advantageously in the various localities and the Bureau of Standards will assist the institute in determining a standard form of test piece most satisfactory for any particular metal to compare with printed statistics on standard alloys.

The Bureau of Standards is also trying to determine a satisfactory pyrometer for brass foundry practice as well as establish a standard nomenclature for copper alloys, many of them now being grossly misnamed. Director Samuel L. Edmands, of the School of Science and Technology, Pratt Institute, Brooklyn, N. Y., through Paul Kreuzpointner of Altoona, Pa., asked if the establishment of a foundry course for young men in the institute would be of service to the foundry business, the course to be about nine months and for the betterment of young men wishing to make foundry work a vocation.

The paper of the evening was presented by W. M. Corse, Lumen Bearing Company, Buffalo, N. Y., and was entitled "Some Aids to Scientific Management in the Foundry." The discussion following the paper was interesting, covering mixtures, heat treatment and testing, and the chief participants were Mr. Corse, G. H. Clamer of Ajax Metal Company, Philadelphia, W. A. Bole of the Westinghouse Machine Company, and S. D. Sleeth of the Westinghouse Electric & Mfg. Company. The use of aluminum as an alloy was discussed at length.

The Carpenter Steel Company, Reading, Pa., has placed contracts with the Forter-Miller Engineering Company, Pittsburgh, Pa., for one 10-ton basic open-hearth furnace, four electric traveling cranes of the Morgan type, two Forter water sealed gas producers, with piping, crushers, hoist and railroad tracks, together with orders for ladles, scales, magnets, etc., necessary for complete mill equipment. This work will be completed in 60 days. It has also decided to increase its new building by two bays in addition to the buildings recently contracted for with the Forter-Miller Company.

At the annual meeting of the La Belle Iron Works, held in Wheeling, W. Va., on Tuesday, March 11, the old board of directors was re-elected. Officers will be elected at the monthly meeting of the board to be held March 25. On request of the parties having in charge the proposed consolidation of a number of tin plate mills, no vote was taken by the La Belle stockholders on the question of giving an option on their plant at a price of $20,000,000. The promoters stated that they were not in position to go through with the matter. The belief is that the proposed consolidation is entirely off.

The Robesonia Iron Company, Ltd., Robesonia, Pa., will build a new blast furnace stack and has retained Frank C. Roberts & Co., Philadelphia, as engineers.

The Red River furnace (charcoal) at Clarksville, Tenn., which has been shut down for two years, has resumed operations. Graham Macfarlane is in charge.

Republic Company Iron Mines

MARQUETTE, MICH., March 8, 1913.—One of the important finds of ore in the Iron River district of the Menominee range in the last two or three years is that made at the Sherwood property by the Republic Iron & Steel Company. The tract is held under lease and has not yet been undertaken. The property will be one of the big mines of the region. Indicative of this was the action of the Michigan State Tax Commission in increasing the assessed valuation from $75,000 to $740,000. M. J. Sherwood, of Marquette, and M. H. Moriarty, of Crystal Falls, both attorneys, are associated in the ownership of the fee. The Sherwood has been tested by diamond drills. Its deposit lies 200 ft. beneath the surface.

In the Iron Mountain district of the Menominee range the work of draining the open pits at the Antoine Ore Company's Traders mine is in progress. An immense volume of water is to be removed and considerable preparatory work is to be done before this subsidiary of the Republic Iron & Steel Company will be ready to produce. Nevertheless, shipments by the time navigation opens will be possible. It will not be surprising if the Traders sends out close to 200,000 tons this year.

Large Manganese Bronze Castings

The American Manganese Bronze Company, 89 John street, New York, has been awarded contract No. 84 of the New York Board of Water Supply, calling for manganese bronze shaft caps for the Catskill aqueduct. These caps are to be used on the top end of risers from the 14-ft. tunnel now being driven under New York City to distribute the water through the street mains. These castings mark a departure in water works practice in line with the policy of making the permanent construction on this great work last indefinitely. The contract calls for 25 distributing caps in the form of a tee, with a bottom inlet 48 in. in diameter, and two outlets, 30 in. in diameter, and a removable cap, weighing over 10,000 lb. each, and six caps with 72-in. bottom inlet, and two 48-in. outlets, weighing over 25,000 lb. each. The six caps are claimed to be the largest manganese bronze castings, other than propeller wheels, ever designed.

It is announced that the plant of the Ohio Steel & Wire Company, Warren, Ohio, the building of which has been delayed, will be completed the coming spring. President E. A. Henry states that a syndicate of Pittsburgh men has become interested in the company, having taken a large block of stock, and will be represented in the management by F. A. Griffin, who will be treasurer. It is also stated that the original stockholders have agreed to take $25,000 additional in preferred stock. This provides sufficient money to put the plant in operation. The company will manufacture wire of various kinds.

The annual exhibit of the work of the evening classes in Pratt Institute, Brooklyn, N. Y., will be held on Monday evening, March 17, from 8 to 10 o'clock and is open to the public. The School of Science and Technology provides instruction in industrial electricity, technical chemistry, mechanical drawing and machine design, strength of materials, stationary engineering and power plant machinery, machine work and toolmaking, carpentry and building, pattern making, sheet metal work, plumbing and advanced manual training for teachers.

At Youngstown, Ohio, on Tuesday, March 11, it was found that the average price of iron bars shipped in January and February was 1.45c. at mill. This entitles the puddlers working under the Amalgamated Association scale to an advance of 15c. a ton, or from $6.45 to $6.60 for March and April. Finishers get an advance of about 1 per cent. Puddlers belonging to the Sons of Vulcan are working under a flat rate of $6 a ton.

The annual report of the Washburn Wire Company for the year ended December 31, 1912, shows net profits of $489,474, after deducting $85,300, or 5 per cent. depreciation on machinery, as against $427,984 in 1911 and $429,329 in 1910. The balance sheet shows a surplus of $1,128,561, against $814,087 the previous year.

Blast Furnace Improvements

Extensive improvements will shortly be made to the blast furnace plants of the Marting Iron & Steel Company and the Ironton Furnace Company, Ironton, Ohio. These will include stock bins and storage trestles for both plants, the contract for the construction of which has been placed with Arthur G. McKee, consulting and contracting engineer, Cleveland, Ohio. Eleven 110-ton ore and stone bins of the Baker suspension type and coke bins having a capacity of 300 tons will be provided at each plant. In connection with the improvements at the Marting plant, one of the two furnace stacks will be equipped with a skip bridge and complete auxiliary equipment. Scale cars and transfer cars will be provided at both plants, and an electric power plant will be installed at the Marting plant. Approximately 1500 tons of structural material, plates and castings will be required.

Plans for the installation of stock bins and trestles for the Clinton Iron & Steel Company, Pittsburgh, Pa., are also being prepared by Mr. McKee. Eleven ore and stone bins of the Baker suspension type and three storage trestles will be constructed. Steel will be used throughout for both bins and trestles.

Compensation in Wisconsin Covers No Damages

An interesting point in workmen's compensation was recently written into the record of the Industrial Commission of Wisconsin, when the application of Charles Pein for damages against the Worden-Allen Company, Milwaukee, was denied on the ground that the law is intended only to compensate for actual loss of time and wages caused by injuries, and not to award damages. His face had been cut by a piece of steel which broke off an angle shear he was helping to adjust. Surgical aid was provided by the company and Pein returned to work without loss of time or pay. He made a demand on the commission for damages for the injury, but this was denied. It was the first opportunity the commission was given to establish this point in an authoritative manner.

The Interstate Commerce Commission has granted authority to establish rates on pyrites cinder from Nashville, Tenn., to Cincinnati, Ohio, of $1.75 per ton of 2240 lb., and to Brookport, Ill., for beyond Cairo, Ill., and Paducah, Ky., $1.50 per ton of 2240 lb., and to establish rates on gas purifying material, namely, iron ore or pyrites cinder, ground or not ground, with or without wood shavings, straight or mixed car loads, or iron ore and pyrites cinder mixed, with or without wood shavings, carloads, minimum weight 15 net tons, to New York, Boston, Philadelphia, Washington, Baltimore, Virginia cities and Eastern interior points, via all rail or rail and water, as set forth in the application, without observing the long and short haul provision of the fourth section of the act.

The Electric Furnace Company, Alliance, Ohio, has increased its capital stock from $50,000 to $100,000. The company builds the Baily electric furnace for heating bars, billets and ingots and is making installations of these furnaces for J. H. Williams & Co., Brooklyn, N. Y.; Dodge Brothers, Ford Motor Company, Studebaker Corporation, and Timken-Detroit Axle Company, all at Detroit, Mich.; Canton Drop Forge & Mfg. Company, Canton, Ohio; Perfection Spring Company, Cleveland, Ohio; McKinnon Dash Company, St. Catharines, Canada.

Twenty-three steel steamships belonging to the lake fleet of the Gilchrist Transportation Company, Cleveland, Ohio, were sold at receiver's sale by the Federal Court in Cleveland, March 6. They brought $3,021,169. Twenty-two were bid in by H. P. McIntosh, president Guardian Savings & Trust Company, Cleveland, as trustee for four Cleveland banks and other creditors. The stockholders will get nothing or practically nothing. The boats will either be sold or operated by a local vessel interest for the creditors.

The Eureka Stone & Ore Crusher Mfg. Company, Cedar Rapids, Iowa, through its general manager, F. H. Douthitt, is installing a large Rochester boring, milling, drilling and tapping machine made by the Rochester Boring Machine Company, Rochester, N. Y. This will be the largest machine of its kind in the State.

Aids to Scientific Foundry Management*

Instituting a Method of Analyzing Metal and Labor Costs Before Attempting Wage Payment and Other Refinements

BY W. M. CORSE.†

One of the first steps in the scientific management of a plant is to plan a proper organization. This gives everyone a base on which to start and clarifies the atmosphere of petty jealousies and misunderstandings. With this organization chart before us we can follow out the various departments and finally perfect a harmonious working people.

My own plan is to start a system of factory records in order that the management may have written information of the happenings in the shop at the present time and a record for the future. These may be daily, weekly or monthly reports and should serve to furnish information that will give a mental picture of affairs in a concise manner. These records should be immediate, adequate and permanent.

I shall attempt to describe some of the records I have used with success in a brass factory. I do not say that these are all that are needed, or that better cannot be found for special cases, but simply that those mentioned will aid the manager to see more clearly the conditions with which he has to contend daily.

Melting Records for the Different Alloys

The first and most difficult report to keep accurately is that of the metal melted and of the output. We may call it the metal report or practice sheet. To secure positive results it is wise to have a separate room in which to store the daily supply of metal for the various mixtures and the shop scrap from each alloy produced. These should be kept in separate bins or boxes, properly marked with the alloy number, so that errors in weighing can be minimized. As many alloys look similar in outward appearance, great care should be exercised first in taking the castings from the foundry to the cleaning room and next in taking the gates and risers and defective castings from the cleaning room and inspection departments. In this case, as in all movements of goods in process, the arrangement of the various departments should be such that the metal moves in a direction that does not cross or back track other material. The tagging of alloys that cannot be readily picked out by their appearance will aid materially in keeping this record accurate. The progressive jobbing foundry will frequently have twenty-five standard alloys, as well as a large number of special mixtures.

Let us follow the process of the metal and note the steps in that process. First, the storekeeper weighs out the bulk metals to the foundry metal room, receiving in return a signed requisition from the weighmaster. This requisition serves as a check on the store records and aids the purchasing department in balancing the materials account with the accounting department at the end of the month. Second, the weighmaster weighs out the various amounts of new metals and shop scrap for the mixtures ordered by the furnace department, using the daily working formulæ given to him by the metallurgist in charge of the laboratory. Before delivering the mixtures to the furnace department, the weighmaster should record on a special ruled sheet, the alloy number, furnace number and the weights of the constituent metals. At the end of the day this sheet goes to the metallurgist to be checked and from there to the cost office for compilation. The totals of these daily sheets for a week give the amount of each alloy charged to the furnace department and when credited with the amount remaining at the end of the week, shows the metal melted for that period. They show not only the amount of the various constituent used in each alloy, but also the total of each metal used for the week. They further show exactly what each furnace is producing.

This information can be used for determining the consumption of metal and gives the purchasing department an accurate figure on which to base future purchases for the maintenance of sufficient stock for the orders on hand. It would hardly seem necessary to draw attention to this record, but I have often been surprised to find that no such information is available in many large foundries.

Getting the Record of the Foundry Output

We now have figures on our weekly summary sheet which may be said to constitute the debit side of the account. The credit side of the account consists of the output of the foundry, divided into ingot metal, good castings, bad castings, gates, risers and recovered metal. They are weighed by the inspection department, the first three coming from the inspection department itself, the fourth from the cleaning room and the fifth from the recovery department. They are separated first by day's work, then by alloys. Subtracting the output of each alloy from the metal charged to the furnace department, will give the gross loss of each mixture and the difference of the totals the gross loss of the foundry for the work.

The net loss is figured at the end of any period by assaying recovered metal too fine to be returned direct to the foundry, from the metal recovery department, figuring the weight of metal recovered and subtracting it from the gross loss. For cost purposes the net loss by weight cannot be used because the recovered metal cannot be sold for its full value to the smelter. We therefore estimate the value of the metal melted for the period in question, divide it into the amount received from the smelter for the recovered metal, thus arriving at the percentage of the recovered metal. This is subtracted from the gross percentage loss to be added to the formula cost of the alloy. This is not strictly accurate in that the gross percentage loss by weight may not represent the formula cost of the new metal, but as the more volatile metals are usually the cheaper, the error is on the safe side.

Figuring the Metal Cost of Castings

Let us take an example: The new metal may consist of 85 parts of copper, 5 parts tin, 5 parts lead and 5 parts zinc. This would cost on the basis of 50-cent tin, 4½-cent lead, 15-cent copper and 7-cent zinc, about 15.82 cents a pound. If we are making ingot metal, we would add the approximate net loss of 3 per cent., determined as outlined above, or 0.47 cent. to 15.82 cents, giving us 16.29 cents as the cost of the metals constituting the alloy.

The fact that such a figure does not give the cost of the alloy in the castings is frequently overlooked in cost accoounting. Let us see why these figures cannot be used in in estimating cost of castings. If we melt 100 lb. of metal we may assume in ordinary brass foundry practice that we will net about 45 lb. of good castings. It is apparent that 100 lb. of metal costs in the formula 15.82 cents per pound and that we lose 3 lb. valued at 0.47 cent. Therefore, 45 lb. of good castings would cost 45 × 15.82 cents or $7.13. Figuring the loss on the value of the good castings we get 0.47÷ 7.13 or 6.6 per cent. The metal in the castings, therefore, costs 15.82 + (6.6 per cent. of 15.82) or 15.82 + 1.04 = 16.86 cents per lb.

An easy way to determine the amount to be added for loss is to divide 100 by the percentage of good castings produced, in this case 45 per cent., giving a factor of 2.2. Multiplying the net loss of 3 per cent. by the factor 2.2 we get 6.6 per cent., which is the same as we determined by the other method. We now have found by the use of the metal report or metal practice sheet, a means of checking the store records, the amount of metal melted, the output and the factors to be used in figuring the value of the metal for cost purposes.

You will agree that these are all essential figures and

*Read at the meeting of the Pittsburgh Foundrymen's Association, March 10, 1913.

†Lumen Bearing Company, Buffalo, N. Y., and secretary American Institute of Metals.

also that we have determined one of the three elements of any cost, namely, material. The other two elements, labor and expenses, are determined by any of the accepted methods of cost accounting.

Reports of Good and Bad Castings Kept Daily

The second record of importance is the daily casting report. The first essential for this report is to have every day's work kept absolutely separate in all departments handling the castings, except the shipping room. There are many advantages in keeping the day's work separate, which pay for the extra labor involved. As soon as the castings are shaken out, they are checked for count and customer's name by the foundry clerk and sent to the cleaning room. This record is made in duplicate in the left-hand columns of the report and a copy goes to the production clerk, who records the number of the pieces made on the shop order, which is a copy of the customer's original order. This in turn enables the production department to keep in close touch with the orders in process.

As the castings come from the cleaning room, they are examined in the inspection department and the weight and count of good and bad pieces noted. The good castings pass directly to the shipping department; while the defective pieces are sorted by pattern number and by molders' numbers, on a bench set apart for that purpose. When the day's work is all inspected, the foundry superintendent and factory engineer go over each lot of defectives and note the causes of defect. This serves to furnish information for the immediate correction of excessive losses. We all know that one of the big leaks in any foundry is the amount of bad castings, so that the relatively small amount of time spent in their examination will surely lead to large savings. It is surprising how frequently this examination is casual, instead of systematic, and it generally needs a cost record to emphasize the amount of the loss through defective castings before much attention is paid to this feature. A bonus paid to the foremen when the percentage of defectives drops below a stated amount, will often stimulate interest in this matter.

The inspection department records the number and weight of the good and bad pieces opposite the count noted by the foundry clerk on the daily casting report and the percentage of defectives, by pieces, is calculated. This report is arranged by molders' numbers so that it will show the foundry superintendent and factory engineer the quality of work being turned out by each molder. A compilation of the daily reports for the week will show the percentage of loss by each molder, and the weight of castings produced. The latter when divided by the number of working hours will show the number of pounds produced per molder per day for the week. This serves as an excellent check on each molder's efficiency.

Another compilation will show the total castings produced per alloy by weight and pieces and also the total weight and pieces for the week. This is the source of part of the information regarding output which was mentioned under the metal report in the first part of the paper. From the total weight and pieces is figured the average weight of the castings produced and the total defective loss in percentage by weight and pieces. This gives a good general idea of the efficiency of the foundry department when tatken in connection with average number of pounds produced per molder per day.

Uses of Metal and Labor Cost Records

You will see that a careful study of the reports as described will give a good general view of the conditions in the foundry. If one wishes, the results may be plotted on a graphic chart which will show these conditions at a glance more effectively than a report consisting of the figures only.

When a job is of sufficient length to make it advisable the record of the defectives may be kept on cards arranged by pattern numbers. The average of a period points out the excessive defects and indicates the patterns to be improved immediately, in order to gain maximum benefits.

The third set of records that I might mention, are the individual cards showing the exact time spent on each job. On these cards are entered the weight and count taken from the daily casting reports, thus giving a complete record of the job to be used as a basis for figuring its cost. The various items of expense chargeable to each job are taken from the expense analysis of the month preceding. This expense analysis is made up from the pay roll, which has been subdivided by job or standing plant order numbers, and the various items of expense are taken from the store room requisitions and the voucher register in the accounting department.

To summarize, we have the sources of information for the three items of cost, viz: Material, labor and expense.

1. The metal report which gives the cost of material.
2. The individual cost cards which give the labor on each job.
3. The expenses analysis which gives the items of expense chargeable to each hour of productive labor on each pound of castings produced, depending on which method is followed in figuring the expense in the department in question.

In order to manage any business scientifically the basic facts which underlie it must be known. As a step in this direction, the reports mentioned above will serve to give fairly complete information. Many others can be added to give specific information, such as figuring piece work rates and standard time and bonus rates, but these should, in my opinion, follow those first mentioned.

I have tried to outline the use to be made of a few principal reports with a view of stimulating interest in securing accurate information. It is only by this means, I believe, that the so-called scientific management can be introduced in a foundry. After a year or two the more complex methods of pay and performance can be added, but I think the mistake may be made of trying to introduce too much at first, thus causing confusion and distrust on the part of all who should reap the most benefit from a perfected system of cost and efficiency.

The Hoover Steel Ball Company

The Hoover Steel Ball Company, Ann Arbor, Mich., a corporation recently organized, has purchased the steel ball department of the Flanders Mfg. Company, Chelsea, Mich., which has been in the hands of a receiver since December 6 last. It is the intention of the Hoover Steel Ball Company to move this department about June 1 to its factory, which is located at Ann Arbor, and is thoroughly up to date, the buildings being entirely of brick and concrete construction and fireproof. L. J. Hoover has been in the ball business for the past 19 years; was superintendent of the ball department of the Standard Roller Bearing Company, later organized the Grant-Hoover Ball Company, and recently has been the manager of the ball department of the Flanders Mfg. Company. His associates, Frank Smith and C. E. Bowling, who have been in the ball business for the past 15 years, will continue in his employ. The new company will immediately double its plant and will be in a position to take on a large quantity of additional business. The Flanders factory has turned down orders for steel balls amounting to approximately $175,000 within the past four months, but hereafter such orders will be taken care of in the new plant.

The Lash Process on the Pacific Coast.—A San Francisco press report refers to the West Coast Iron Company, which is building a plant at Sixteenth and Rhode Island streets, for the production of pig iron, oil being used as fuel. Horace W. Lash, Cleveland, Ohio, president of the company, is in charge of the work and it is stated that pig iron will be turned out by July. It is stated that local ores and scrap will be the raw materials of the process, of which Mr. Lash is the inventor.

The Bucyrus Company, at its annual meeting held in Milwaukee last week, elected J. H. Tweedy, Jr., a director. Other officers were re-elected. In 1912 the orders for new machinery, exclusive of repair parts, increased 104 per cent. as compared with the preceding year, and total orders were 74.8 per cent. in excess of 1911. A very satisfactory growth in the foreign business brought such sales up to 10.5 per cent. of the total.

Metal Trades Annual Meetings

Worcester Branch

The Worcester Branch, National Metal Trades Association, held its annual meeting March 6. These officers were re-elected: President, John W. Harrington, Harrington & Richardson Arms Company; vice-president, Paul B. Morgan, Morgan Construction Company; treasurer, A. W. Beaman, Stockbridge Machine Company, all of Worcester. Five members of the executive committee were elected to serve two years as follows: A. W. Whitcomb, Whitcomb-Blaisdell Machine Tool Company, Worcester; George M. Cheney, Litchfield Shuttle Company, Southbridge, Mass.; J. H. Drury, Union Twist Drill Company, Athol, Mass.; H. B. McDonald, Simonds Mfg. Company, Fitchburg, Mass., and Herbert L. Flather, Flather & Co., Inc., Nashua, N. H.; for one year, Frank F. Phinney, Warren Steam Pump Company, Warren, Mass.

The branch held its 11th annual banquet in Mechanics Hall on the evening of March 5, at which 325 were present. President Harrington presided. The guests included Henry D. Sharp, Providence, R. I., president of the National Metal Trades Association; George M. Wright, Mayor of Worcester, who is president of the Wright Wire Company; Congressman Samuel E. Winslow, who is at the head of the Samuel Winslow Skate Mfg. Company, Worcester, and Hon. Frederick Fosdick, of the Fitchburg Steam Engine Company, Fitchburg, Mass. President Sharp made an interesting address on the progress of the Nation Association, which included strong commendation of the work that is being done by the labor bureaus in the various cities. He expressed the satisfaction of the executive council in procuring the services of John D. Hibbard as commissioner.

Cleveland Branch

The annual meeting of the Cleveland Branch, National Metal Trades Association, was held in the library of the Chamber of Commerce, Cleveland, Ohio, March 7. After the serving of lunch the business session was held. President C. B. Wilson, in his annual report, referred to the satisfactory condition of the branch as regards membership and finances. During the year six new members had been enrolled, among them the Cleveland Twist Drill Company, American Clay Machinery Company and United Brass Mfg. Company. Philip Frankel, who closed his eleventh year as secretary, made a report in which he told of the efforts of the various labor organizations to gain a foothold in the city during the year, stating that they had made some headway in shops outside of the organization. On the subject of legislation in Ohio he said:

> So much legislation affecting the very vitals of the manufacturing industry of this State has been introduced at our State capitol in the past few months that we hardly know at times whether the stopping point would ever be reached. Hardly a day has passed that some bill directly inimical to the employing interests of the State of Ohio has not been introduced. All forms of legislation for the regulation of business and manufacture and for the employment of labor have been introduced, but to date not one bill affecting the regulation of labor organizations has been heard of in spite of the great amount of lawlessness, dynamiting, etc., that can be directly traceable to those very organizations. It is plainly noticeable that the labor unions have, to a great extent, taken their fight to the Legislature rather than attempting to inflict their unsuccessful encroachments through the methods of strikes, and the point that I desire to drive home forcibly here is that where years ago you manufacturers resisted to the bitter end, and successfully, any unfair demands in the way of wages, the minimum wage, the regulation of apprentices, the union shop and all that goes with it; where years ago manufacturers spent thousands and thousands of dollars resisting these unfair propositions, today these very manufacturers sit idly by and permit these same labor organizations, these same agitators, by means of legislation, to declare legal the very things they so forcibly resisted when combating strikes. The employers have become almost completely passive on the matter of legislation being introduced at Columbus.

An interesting talk on the work of the association was given by John D. Hibbard, acting national commissioner. J. W. Bryce, Battle Creek, Mich., president of the Trade and Workers' Association of the United States, talked on the spirit of unrest among laboring men. He called attention to the fact that various labor papers have a very large circulation among workmen, but that there is a very limited circulation among employees of publications representing the side of employers. He urged employers to take more interest in the circulation of papers representing the employers' side not only among workmen but among preachers and others.

Officers for the coming year were elected as follows: President, James H. Foster, Hydraulic Pressed Steel Company; vice-president, Frederick Metcalf, Chase Machine Company; treasurer, Franklin Schneider, Van Dorn & Dutton Company. Executive board, George Cowley, Hill Clutch Company; J. H. Francis, Kilby Mfg. Company; Christian Girl, Perfection Spring Company; C. B. Wilson, Ferro Machine & Foundry Company. A vote of thanks was tendered Mr. Wilson, the retiring president, who because of his other duties declined to accept reelection.

Cincinnati Branch

The thirteenth annual meeting and banquet of the Cincinnati Branch, National Metal Trades Association, was held at the Business Men's Club, Cincinnati, on the evening of March 6.

B. B. Quillen, general manager, Cincinnati Planer Company, chairman of the nominating committee, proposed the following list of officers to serve for the ensuing year, all of whom were formally elected: President, P. O. Geier; vice-president, Murray Shipley; treasurer, A. H. Teuchter; secretary, Benjamin Sebastian, and assistant secretary, W. S. Dickson. Henry Ritter, the retiring president, who has served two consecutive terms, was tendered a rising vote of thanks by the association.

After the routine business was transacted, John W. Neil, toastmaster, introduced the following speakers: Albert Boettinger and John L. Vance, who spoke on the proposed Cincinnati river terminal question, and Herbert H. Rice, of Indianapolis, a member of the Administrative Council, who made an address on association work.

A committee was appointed to draft resolutions on the deaths of the following members that have occurred since the last annual meeting: E. H. Hargrave, Theodore Albert, Anthony Schneir, D. M. Forker, Emil Von Wyck and William N. Hobart.

Among out-of-town guests were Charles E. Hook general superintendent, and A. K. Lewis, construction superintendent, American Rolling Mill Company, Middletown, Ohio; M. Cokely, Lima, Ohio, and Percy A. Ware, Central Western manager of *The Iron Age*.

The offices of the National Metal Trades Association will be moved about May 1 from the New England Building, Cleveland, Ohio, to Chicago, the latter city being the home of the acting national commissioner, John D. Hibbard, who at the annual convention in April will succeed Robert Wuest as national commissioner.

General Electric Equipment for Steel Plants

The General Electric Company, Schenectady, N. Y., furnishes the following information regarding recent orders received from steel manufacturers:

The Forged Steel Wheel Company, Butler, Pa., is equipping the power plant of its new steel mill with three 2500-kva. Curtis turbo-generator units, a 75-kw. induction motor-generator set, 750-kw. synchronous motor-generator set, 320-kva. motor-generator set and switchboard. Among the large motors for the mill are included one of 2000 hp., one of 1000 hp., one of 800 hp. and one of 600-400 hp. The Chase Rolling Mill Company, Waterbury, Conn., will add to the electrical equipment of its mill at Waterville, Conn., a 750-kva. Curtis turbo-generator and 50-kw. motor-generator set. The Pittsburgh Crucible Steel Company will install 115 motors ranging from 5 to 105 hp. in its mill at Midland, Pa. The Weirton Steel Company, Weirton, W. Va., is adding to the equipment of its plant for electric drive two 750-kw., 2-unit, 3-bearing motor-generator sets and six 50-hp., six 150-hp., four 300-hp., nine 25-hp., and two 10-hp. motors and switchboard apparatus. The Lackawanna Steel Company, Buffalo, N. Y., will add to the electrical equipment of its plant three 200-hp. motors. All the foregoing is General Electric equipment.

The Upson Nut Company, Cleveland, Ohio, will shortly add a new 60-ton open-hearth furnace to its steel plant, making five furnaces of the same type and capacity. Room was provided and foundations were built for the additional furnace when the plant was erected.

The New Ways and Means Committee

WASHINGTON, D. C., March 11.—The Democratic members of the Ways and Means Committee, that is, the majority members, have been appointed by a House Democratic caucus, and these will have the formulation of the tariff revision measures to be submitted to the extraordinary session of Congress which has been called by President Wilson to convene April 1. Three things now appear to be decided:

1. That the committee has been organized by Chairman Underwood (who was re-elected as chairman) and other House leaders who entertain views similar to Mr. Underwood, and this indicates that the revision measures will be similar to those reported by the Ways and Means Committee and finally vetoed by President Taft.

2. That the Payne-Aldrich tariff act is to be revised schedule by schedule. Democratic members of the committee express the opinion that the woolen bill will be reported first, then the cotton bill, and then the bill revising the iron and steel schedule.

3. That the House leaders can put through the House any bill or bills reported by the Ways and Means Committee; if they are to be changed or amended, it must be done in the Senate or as the result of conference between representatives of the House and the Senate.

Chairman Underwood and other influential members of the House are using their best efforts to have the work of the extra session confined to passing the two appropriation bills that failed at the session which has just ended and the revision of the tariff, and possibly absolutely necessary legislation in connection with the Panama Canal, which will be open for business before the convening of the regular session in December.

The Ways and Means Committee, as the result of a caucus rule, is also a committee on committees, and it has been semi-officially announced that it will not consider the naming of the House committees until after the extra session meets and the House has been organized. It is not believed that the organization will take more than two days, as the caucus unanimously voted to re-elect Speaker Clark and practically all other House officers. The action of the House in holding back the naming or consideration of the committees would indicate that an agreement has been reached with President Wilson that the work of the session shall be confined as outlined above, and that such subjects as legislation on currency, amendment of the banking laws, and amendment of the Sherman act shall go over until the beginning of the regular session in December.

The Democratic membership of the Ways and Means Committee, which will report the tariff revision measures is made up as follows: Oscar W. Underwood, Alabama, chairman; Francis B. Harrison, New York; Dorsey W. Shackleford, Missouri; Claude Kitchin, North Carolina; Henry T. Rainey, Illinois; Lincoln Dixon, Indiana; Cordell Hull, Tennessee; W. S. Hammond, Minnesota; Andrew J. Peters, Massachusetts; A. Mitchell Palmer, Pennsylvania; Timothy T. Ansberry, Ohio; A. C. Stanley, Kentucky; John J. Garner, Texas; James W. Collier, Mississippi.

Of the Republican members of the Ways and Means Committee of the last Congress only Representatives Payne of New York, and Fordney of Michigan were re-elected. The Republican caucus will meet on Monday, March 31, and name the Republican members of the committee.

Representatives Stanley, Garner and Collier succeed on the Committee Representatives James, Ransdell and Brantley, the first two named having been elected to the Senate and the last named not succeeding himself as a member of the House.

W. L. C.

The Taylor-Wharton Iron & Steel Company, High Bridge, N. J., held its annual meeting March 4. The balance sheet presented was very satisfactory. The following directors were elected for the ensuing year: Dr. Henry M. Howe, Knox Taylor, Edgar S. Cook, Henry J. Cochran, A. E. Borie, Dr. V. G. Simkhovitch, James Imbrie, William Selfridge and John F. Wallace. The company announces that H. A. Johann and Martin O'Shaughnessy, who have been in charge of the Chicago and Middle West territory, have resigned, effective March 31, to engage in other business. Its Chicago office will be in charge of George R. Lyman and J. R. Bolgiano, with Guy H. Bergen representing the company particularly in the Mesaba Range district.

The Leetonia Steel Company

The Leetonia Steel Company has been organized and has acquired the blast furnace of the Salem Iron Company, at Leetonia, Ohio, about 45 acres adjacent to the furnace, and the Leetonia Railroad, having about eight miles of track, connecting with the main lines of the Pittsburgh, Fort Wayne & Chicago and the Erie railroads. The new company succeeds the Dover Steel Company, organized some time ago, and which had intended to locate at Canal Dover, Ohio. It is the intention to erect on the property an open-hearth steel plant, having two 70-ton open-hearth furnaces, using direct hot metal, and a 30-in. three-high bar mill. Small ingots will be poured, which will afterward be rolled into billets and sheet bars.

Arrangements have been made for the purchase of an open-hearth building, 107 x 275 ft., a Wellman-Seaver-Morgan charger and a 75-ton Morgan electric crane. The sheet mill building will be 140 x 1000 ft., of steel construction. The power plant and boiler equipment of the Salem Iron Company will be used by the new owner, but the capacity will be greatly increased.

It is the intention of the company to push work rapidly on the open-hearth plant, and it is expected to be ready about September. Work will then be started on the building of the sheet mills, plans being laid for 10-hot mills and seven cold mills. Only four or six hot mills will be erected at first, the others to be added later. The company expects to make about 350 tons of open-hearth steel per day in the form of billets and sheet bars, and all will be sold in the open market until the sheet mills are finished.

The company will do much of its own construction, as some of those interested in it are practical men, formerly connected with the Allegheny Steel Company, Brackenridge, Pa. The product of the sheet mills will be high grade electrical sheets and other specialties. Albert P. Meyer is president; N. J. McKeefrey, treasurer; Howard C. Meyer, secretary, and Archie Smith, general manager. The comppany has opened an office in room 805, First National Bank Building, Pittsburgh, and will also maintain offices at Salem, Ohio.

February Copper Production and Stock

For the first time since last August a decrease in stock is shown in the report of the Copper Producers' Association. The decrease in February was only 896,134 lb., but the important fact is that the accumulation of copper in producers' hands has been checked. The February statement issued by the association compares as follows with the figures given for the previous month:

	February. Pounds.	January. Pounds.
Stock of marketable copper of all kinds at all points in the United States at first of the month	123,198,332	105,312,582
Production of marketable copper in the United States from all domestic and foreign sources in the month	130,948,881	143,479,625
Deliveries of marketable copper in the month:		
For domestic consumption	59,676,492	65,210,030
For export	72,168,523	60,383,845
Total deliveries	131,845,015	125,593,875
Stock of marketable copper of all kinds on hand at all points in the United States at close of the month	122,302,198	123,198,332

The decline in production was mainly due to the shorter month, but total deliveries increased 6,251,140 lb.

The F. W. Mark Construction Company, Birmingham, Ala., has been awarded a contract to build the plant of the National Cast Iron Pipe Company at Boyles, Ala., at a cost of $100,000. The buildings include a foundry, 66 x 480 ft.; machine and pattern shop, 66 x 210 ft.; cleaning shed, 30 x 126 ft., and an additional machine and pattern shop, 30 x 252 ft. The construction is to be of steel, concrete and brick. The Virginia Bridge & Iron Company will furnish the steel. A. H. Ford, president Birmingham Railway, Light & Power Company, is president.

The Belvidere Screw & Machine Works, Belvidere, Ill., at its annual meeting, re-elected the following officers: Dr. F. S. Whitman, president; George M. Marshall, vice-president; W. S. Brown, secretary and treasurer.

The Machinery Markets

Some improvement is observed in new demand for machinery in a few cities, although general conditions are unchanged, with activity only fair and the bulk of business made up of deals involving the sale of one or a few machines. The best feature of the New York market is a better outlook for railroad buying of machine tools and shop equipment; otherwise conditions are unchanged. Philadelphia continues to have an even run of inquiries and sales of one or small lots of tools. Little change is to be noted in New England, where manufacturers continue busy with the orders on their books and dealers are prosperous. There has been unexpected betterment in the demand for textile machinery. Conditions are a little more quiet in Cleveland, although the outlook is better and the demand for turret lathes is good, both for export and home delivery. In Cincinnati there is little change except that inquiry is improved. There has been an improvement in the call for machine tools in Detroit because of many scattered orders from the automobile trade. The railroads have been doing some miscellaneous buying in Chicago. While the number of orders has dropped off a little in the Central South, conditions are generally good and manufacturing plants are operating on full time. Business is reported as satisfactory in Birmingham, especially in power and sawmill equipment. More numerous inquiries and general improvement is reported in St. Louis. Trade in Texas has been helped along by the large number of cities and towns which have undertaken waterworks installations and the construction of other public utilities. On the Pacific coast there is a very satisfactory volume of general inquiry out and the trade is taking on an appearance of activity which is in part due to purchasing by the Southern Pacific Railroad for its Portland shops.

New York

NEW YORK, March 12, 1913.

A better outlook for buying of machine tools and shop equipment by railroads is the best feature to be noted in the New York market. Some of this prospective business has been pending for some time, such, for instance, as the heavy requirements of the Boston & Maine. The New York Central Railroad, it is believed, will come into the market before long for machine tools which it is known to have been considering, while the Lehigh & New England has been formulating a list of its requirements for a new shop. General conditions are unchanged otherwise, the majority of sellers still saying that trade is rather slow and consisting almost entirely of small, individual deals. As was the case last week a few of the dealers say that they have no cause for complaint as their volume of business is fairly good. Some good sales of second-hand tools have been made, including some large machines from stock, which was a cause of satisfaction. In the last three days inquiries have improved a little in number, but large ones are still lacking. Automatic screw machines continue in good demand, while the demand for their products is excellent. Although new business may not be as snappy as it was a few weeks ago with some manufacturers' representatives, both salesmen and demonstrators are busy with the work of installing and starting machines sold a few weeks ago.

The Turner Construction Company, 11 Broadway, New York, has been awarded the general contract for the construction of five different reinforced concrete buildings at the Bayonne, N. J., plant of the Vacuum Oil Company.

Plans for an extension of the paper box factory of W. W. Hawks, 118 Water street, Newburgh, N. Y., are being prepared by architect F. E. Estabrook of that city. The new building will be 70 x 125 ft., two stories.

The Static Electro Eradicator, Inc., Fabius, N. Y., has been incorporated with $25,000 capital stock to manufacture electrical apparatus. R. L. Vezius, A. H. Smith and H. S. Palmer, Syracuse, N. Y., are the incorporators.

The Fuller & Robinson Company, Albany, N. Y., is completing plans for a four-story brick factory of mill construction to be erected at Arch street and Trinity place for the American Cigar Company, lessees.

The Kirkham Aeroplane & Motor Company, Savona, N. Y., has been incorporated with a capital stock of $100,000 by Charles B. Kirkham, Edwin H. Skinner and Stanley I. Vaugh, Savona, and will engage in the manufacture of motors for aeroplanes, motor boats, etc.

Plans are being completed for repair shops to be erected at Mechanicsville, N. Y., by the Boston & Maine Railroad Company. A. B. Corthell, Boston, Mass., is chief engineer.

The Motor Truck Mfg. Corporation, Mt. Vernon, N. Y., has been incorporated with a capital stock of $150,000 to manufacture and deal in motors, engines, etc., and will establish a plant. The directors are H. Hitchenbach and L. Bertsch, Mt. Vernon, and A. J. Albert, Hoboken, N. J.

The Morrow Mfg. Company, Elmira, N. Y., has commenced construction of its new manufacturing plant which will be 300 x 300 ft., one story.

The John S. Tilley Ladder Company, Inc., Watervliet, N. Y., has been incorporated with a capital stock of $100,000 by J. S. and R. E. Tilley, Watervliet, and J. Tilley, Jersey City, N. J., and will build a plant for the manufacture of ladders, etc.

The Rome Mfg. Company, Rome, N. Y., is building an extension to its tube mill 70 x 170 ft., one story, from plans of Charles Kiehon, engineer, Utica, N. Y.

Harry R. Drake & Sons, Inc., Palmyra, N. Y., have filed articles of incorporation for the manufacture of paper boxes, etc., for which a plant will be equipped. The capital stock of the company is $75,000. H. R., A. R. and C. H. Drake, Newark, N. J., are the incorporators.

The Acme Road Machinery Company, Frankfort, N. Y., is enlarging its plant by the addition of a building 50 x 150 ft.

The Buffalo Steam Pump Company, North Tonawanda, N. Y., will erect additional buildings of three and four stories on land recently purchased adjoining its present plant. The company is now completing an extensive addition.

The manufacturing plant of Setter Bros., Cattaraugus, N. Y., is to be moved to Jamestown, N. Y., where a plant for the manufacture of furniture veneers will be built and equipped.

The Central Flatiron Mfg. Company, Binghamton, N. Y., has purchased property at Grand and Cook avenues, that city, and is having plans prepared for the erection of a factory.

Articles of incorporation have been issued to the Central Motor Supply Company, Rochester, with an authorized capital stock of $30,000, to manufacture electrical and mechanical devices. Plans for a factory are under way. R. F. Close, W. Wood and C. W. Gallagher are the directors.

The Crosby Company, Buffalo, N. Y., manufacturer of sheet metal stampings, has in course of erection large additions to its plant, which are expected to be completed in April. The added space is required for heavy drawn work.

The Buffalo Jewelry Case Company, Buffalo, has been incorporated with a capital stock of $200,000 to continue the business of the established company of the same name heretofore unincorporated. Some enlargement of the company's plant at Broadway and Walnut street and increased manufacturing facilities are contemplated. Daniel Wile is president and Nathan Steigerwold, vice-president and treasurer of the company.

The Beaver Company, Buffalo, manufacturer of Beaver board, has increased its capital stock to $2,000,000, the increase being made to provide for plant expansion. A new plant is to be established at Edmonds, Wash., on Puget Sound near Seattle, and additions are being planned for the Roanoke division plant at Roanoke Rapids, N. C., where the company has large water-power and timber interests. A plant to cost between $300,000 and $400,000 is also to be built at Thorold, Ont.

Plans have been prepared for a large addition to be made to the plant of the Norton Company, manufacturer of emery wheels and abrasives, at Buffalo avenue, Twenty-seventh street and the Niagara Junction Railroad, Niagara Falls, N. Y. The addition will be of reinforced concrete construction and is estimated to cost $50,000.

The American Cataract Power Company, Buffalo, has filed incorporation papers with a capital stock of $1,000,000, to generate electric power at Niagara Falls. Among the incorporators are John F. McDonald, Herbert A. Meldrum, Robert R. Hefford, Edward L. Koons, Maurice M. Wall and Howard A. Forman.

The Buffalo Package Company, Buffalo, recently incorporated with $75,000 capital stock by G. and C. V. Morris and A. Kushman, will build and equip a plant for the manufacture of pails, barrels, etc.

New England

BOSTON, MASS., March 11, 1913.

Conditions change but little from week to week. Dealers in the machinery and supply trade are prosperous and most of the manufacturers of machine tools are busy and some of them are so rushed with orders that they cannot keep up with the demand. The cotton machinery people have had an unexpected increase in business. The paper machinery builders have a very good total of orders on their books. The grey iron foundries are not running at full capacity as a whole. The jobbing foundries bring down the average, for they are somewhat dull. The pig-iron trade, therefore, does not consider business satisfactory in New England. Labor conditions are as good as could be expected. Wages are abnormally high as compared to previous years of like industrial activity, but the likelihood of serious strikes in metal industries is not great.

The Chandler & Farquhar Company, 36 Federal street, Boston, has taken the second story of the building to extend the space devoted to its mill supply business, increasing it 50 per cent. The arrangement of the entire establishment has been changed in an important way, greatly increasing the convenience in handling business. The effect is to stretch out each department to give it additional capacity. The business has grown very rapidly, until it was imperative that accommodations be largely increased.

The Bristol Company, Waterbury, Conn., manufacturer of recording and other instruments, will erect an additional factory building, 52 x 160 ft., three stories, of brick and stone.

Announcement is made at Stamford, Conn., that the Yale & Towne Mfg. Company will erect two large buildings of brick and steel construction. One will be 245 x 296 ft., one and three stories, and the other 50 x 200 ft., six stories.

The Hendee Mfg. Company, Springfield, Mass., manufacturer of motor cycles, has prepared plans for new buildings which will double the capacity of the works, and much of the new building will be done immediately. Most important is the announcement that the company will establish a large and complete drop forging plant in which it will do all work of this character required in its product. This building will be of brick, concrete and steel, of absolute fire proof construction. It will be in the form of an E, making four distinct units, three of them parallel and the fourth connecting them at the front. The area of the group will be 234 x 293 ft. The central building will be the drop forge shop, where an initial equipment of 20 hammers will be installed, the purpose being eventually to increase the battery to 44 hammers. One of the other three parallel wings will be the die shop and the third will be used for the making of springs and for other light manufacturing. A complete equipment will be installed for the economical handling of material. The next extension will be a machine shop building 175 x 300 ft., and there will be a new building for the blacksmith shop and a heating plant. Adjoining the property is the plant of the Harley Company which operates a foundry, and the Hendee Company has purchased an interest in this business in order to procure a larger supply of castings. About 35,000 motor cycles are being constructed for the 1913 season. When the additions are completed the capacity will be increased to 70,000 machines a year.

The War Department has accepted a new cavalry sabre designed by the Armory at Springfield, Mass., and has authorized the manufacture of 20,000 of the weapons, which will be completed this year. Certain machinery has been ordered in connection with the new department of manufacture.

The New York, New Haven & Hartford Railroad has leased to Morton F. Plant that part of its trolley system which covers eastern Connecticut. The transaction is an important one as it involves 223 miles of street railroad line, the purchases for which amount to a very large sum of money annually.

The business of the Atlas Motor Car Company, Springfield, Mass., has been purchased by the Lyons Atlas Company, Indianapolis, Ind. The Springfield factory will be discontinued. The sale includes the drawings and manufactured parts of the Knight cars which have been developed by the Atlas Motor Car Company, and patent rights for the Knight automobile engine. H. A. Knox of the Springfield company has been made head of the automobile department of the Lyons Atlas Company.

Philadelphia

PHILADELPHIA, PA., March 12, 1913.

Business continues on about an even basis, moderate inquiry for single and small lots of tools developing from week to week and usually accompanied by moderate buying, particularly in single tools. Trade conditions are considered reasonably good and both manufacturers and merchants express themselves as favorably impressed with the trend of the market. Railroads show little activity in machine tool buying, continuing their policy of making inquiries for odd tools as they may be needed. There appears to be no immediate prospect of heavy buying by roads in this district, even though provisional tool lists were prepared months ago. Considerable business in moderate power equipment installations of the medium and smaller horse powers is pending. Second-hand machinery continues in good demand, particularly equipment of recent make. Good business is moving in both iron and steel castings.

The Pennsylvania Railroad sent out inquiries in the week for a lathe and a shaper.

Murphy & Bro., textile manufacturers, are having plans completed for a two-story brick factory building to be erected at Thirtieth and Reed streets. The building is to be 60 x 114 ft. and specifications will include electric lighting, steam heating and an elevator.

Fire last week damaged the machine shop of A. S. Ashman, Sons & Co. at Tulip and Tioga streets. The damage was confined to the machine shop and only temporarily disabled the operation of that department. Operations have again been resumed, the damage to the machinery equipment being such as could be easily repaired.

The Victor Talking Machine Company, Camden, N. J., has awarded a contract to Irwin & Leighton, of this city, to build a brick and terra cotta addition, six stories, 86 x 120 ft., to its machine shop. The building will be fireproof and heated with steam. Three electric elevators are to be installed. Ballenger & Perrot are the engineers. It is stated that the equipment for the new addition will be purchased in small lots, from time to time, rather than by means of a single large list.

It is stated that the Darby Machine Company, Darby, Pa., will remove from its present quarters on Fifth street to a new building being erected on the Chester pike.

A four-story manufacturing building, 60 x 72 ft., is to be erected at York avenue and Noble street for Walter P. Miller, from plans by Harris & Richards. Specifications include electric lighting, steam heating and elevators.

William Sellers & Co., Inc., are preparing to erect several of the buildings for their new plant at Folsom, Delaware County, Pa. The grading work is now under way. According to tentative plans the foundry department will be the first to be moved to the new location.

It is stated in the daily press that the Weatherly Iron & Steel Company, Weatherly, Pa., has closed the pending deal by which it takes over the large repair shops of the Lehigh Valley Railroad Company at that place.

Stern & Silberman, engineers, Land Title Building, have been taking bids for the erection of a new carhouse and shops at Atlantic City, N. J., from plans by J. Horace Funk. The buildings are to be of brick, steel and concrete, one and two stories, 187 x 390 ft.

Ballinger & Perrot, engineers, are taking bids for a one and two-story building 60 x 150 ft., to be used for Dutch Process paint making for Harrison Bros. & Co., Thirty-fifth street and Gray's Ferry avenue.

The Dreadnought Tire & Rubber Company, 1017 Munsey Building, Baltimore, Md., has been incorporated with $1,000,000 capital stock. The company contemplates erecting buildings and installing machinery to manufacture automobile tires and miscellaneous rubber goods. The officers are A. F. Gilbert, president; Wilmer Dunbar, vice-president and general manager, and Walter E. Hill, secretary and treasurer.

Chicago

CHICAGO, ILL., March 12, 1913.

The month of February for the most part brought to local distributors of machinery a satisfactory volume of sales. There were no individual purchases of unusual prominence but from a variety of industries a very steady stream of orders for a few tools at a time was maintained throughout the month. The large list of machines for which the Wabash received quotations remains, with some exceptions, unplaced and appearances indicate that the awards will be well distributed. Among the interesting sales of the past week were five Bullard vertical turret lathes, all being placed in Milwaukee. There has been some miscellaneous buying by some of the railroads but the following list of tools for which the Pere Marquette is asking prices is the only new railroad business of consequence now offering:

One No. 2 Lennox bevel shear.
One 72-in. vertical punch.
One 1¼-in. bolt threading machine.
One pipe bending machine.
One double spindle centering machine.
One combination drill and surface grinder.
One 42-in. drill press.

The Aurora Automatic Machinery Company, Aurora, Ill., manufacturer of Thor pneumatic tools and motor cycles, has leased the six-story building at Superior and Sedgwick streets, Chicago, formerly occupied by the Brunswick-Balke-Callender Company, to be used for the greater centralization of its motorcycle department.

The Lyons Machine & Mfg. Company, Lyons, Mich., whose intention it was to erect a new factory at Muskegon Heights, has arranged to occupy the plant formerly used by the Henry Motor Company at Muskegon instead. This change will enable the company to be in operation at its new location early in April.

The Chicago & Alton Railroad has had plans prepared for a one story roundhouse of 30 stalls to be erected at Glenn, Ill., and to cost $80,000.

Sears, Roebuck & Co., Chicago, are preparing to erect an additional six story manufacturing building adjoining the present plant at Harvard and Homan avenues.

The Chicago Electric Castings Company, Chicago, has been incorporated with a capital stock of $11,000 for the purpose of manufacturing electric furnaces and equipment. The incorporators are Wilton Bentley, of the Bentley-Snyder Company; Edward C. Higgins and Matthew Finn.

The Acorn Wire & Iron Works, Chicago, has been organized with a capital stock of $3,000 by Otto Kitzelman, John D. Dilley and H. Kitzelman, 5918 Lowe avenue, Chicago.

The Butler Street Foundry & Iron Works, Chicago, was damaged by fire March 5 with a loss estimated at $2,000.

Peoria capital, supported by the Chicago, Burlington & Quincy Railroad, is preparing plans for the erection of a power building to cost $500,000 in that city, the purpose being to secure a number of small manufacturing enterprises with the attraction of moderate rental and power rates.

The Maple City Foundry & Furnace Company, Monmouth, Ill., is the new corporate name of the McIntosh Foundry & Machine Company. W. C. Talbot is president of the new company. In addition to its manufacturing it will conduct a warehousing business in structural steel, plates and sheets and cast iron building materials.

J. T. McGrath, Bloomington, Ill., is in the market for several drills, lathes, a planer and slotter and other auxiliary machinery.

The Midland Motor Company, Moline, Ill., has awarded the contract for the building of a 40 ft. extension to its manufacturing plant. The output is being increased under the direction of J. D. Beebe, secretary and general manager.

The Continental Foundry & Machine Company, Gary, Ind., is the name under which the Kells Foundry & Machine Company has been reorganized. The new company has a capital stock of $40,000, Charles Pekat being president.

At the Hammond, Ind., plant of the Standard Steel Car Company, fire starting in the tunnels through which oil is piped, resulted in considerable damage to the engine room and foundry.

The White Enamel Refrigerator Company, St. Paul, Minn., has taken out a permit covering the erection of a brick factory addition to cost $16,000.

Following an investigation of the available sites in various manufacturing localities it is reported that the Johns-Manville Company of New York will locate at Riverdale Ill., and has purchased 120 acres on the northeast side of the Panhandle Railroad within the loop formed by the bend of the Calumet River. The Illinois Central Railroad is on the east, the Panhandle on the southwest, the Baltimore & Ohio Chicago Terminal to the southeast, while the village of Riverdale has granted the Indiana Harbor Belt a right-of-way parallel west of the Illinois Central. It is understood that $1200 an acre was paid for the land. It is the intention, it is said, of the Johns-Manville Company to consolidate its various manufacturing establishments in different parts of the West at this place, giving employment to between 2000 and 3000 persons.

The Universal Wrapping Machine Company, Joliet, Ill., has been incorporated by Frank Streich, F. P. Foran and Fred W. Walker and will equip a plant for the manufacture of patented machinery.

The Farmers Grain & Supply Company, Warsaw, Ill., with $15,000, has been incorporated and will equip a grain elevator at once. The stockholders are J. L. Daugherty, R. C. Kerr, J. L. Hodges.

Detroit

DETROIT, MICH., March 12, 1913.

The demand for machine tools has stiffened appreciably and the activity in standard lines of tools is especially pleasing. The inquiry for general machinery is also better. Scattered orders from the automobile industry for small lots of tools are reported. Of considerable interest is the renewed activity in woodworking equipment which has been moving rather slowly for some time past. A considerable amount of inquiry for general foundry equipment is before the trade, indicating the generally satisfactory conditions in this industry. A moderate amount of business in second-hand machinery is reported. Power plant equipment is also in fair demand. Outdoor work is still retarded by the severe weather, but contractors report that a number of large propositions are expected to be submitted in the present month and look for increasing activity.

The Frank Bros. Iron & Metal Company, Detroit, is completing a new two-story factory building at Orleans street and Grand boulevard. The plant is of mill construction 50 x 130 ft.

The Detroit Shipbuilding Company, Detroit, is completing plans for a new power building at its Orleans street plant. The plant will be 57 x 78 ft., two stories and of brick construction and will be equipped with three 200 h.p. vertical water tube boilers and a 150-kw. generator. The plans will also provide for an elevated coal bunker, which, however, will not be installed immediately.

The Goodspeed Detroit Mfg. Company, Detroit, whose incorporation was recently announced, has purchased a factory site at Harper avenue, near St. Antoine, on which it plans to erect a modern two-story factory building 100 x 160 ft. The company will manufacture automobile parts.

The Superior Foundries Company, Detroit, has been incorporated with $30,000 capital stock to engage in the general foundry business. The incorporators are Joseph Sturges, Harry T. Peters and William L. Willard.

The Nelson-Peterson Mfg. Company, Detroit, manufacturer of automobile parts, has increased its capital stock from $20,000 to $100,000.

The Brinker Rotary Engine Company, Centerville, Mich., has been incorporated with $30,000 capital stock to manufacture gas engines. C. B. Brinker is president; F. S. Cummings, secretary, and H. J. Hampson, treasurer.

The Emery Whitmore Company, Jonesville, Mich., has been incorporated with $5,000 capital stock to manufacture automobile supplies. G. S. Emery and Guy Whitmore are the principal stockholders.

The Waterworks Commission, Lansing, Mich., is asking for bids on a 3,000,000-gal, centrifugal motor-driven pump for installation in the municipal pumping station.

A dispatch from Buchanan, Mich., states that the Lee & Porter Axle Company has definitely decided not to rebuild its plant which was recently destroyed by fire. It had been previously reported that a new plant would be erected.

The Lyons Tool & Die Company, Muskegon, Mich., will enlarge its plant by an addition which will double its present facilities. The company manufactures jigs for use in automobile work and reports an excellent

volume of business. The company recently moved from Lyons, Mich.

The taxpayers of Grand Rapids, Mich., will vote shortly on a proposition to bond the city for $100,000 for the purpose of providing additional equipment for the municipal waterworks plant.

The Michigan Hearse & Carriage Company, Grand Rapids, Mich., has increased its capital stock from $30,000 to $75,000 and will build an addition to its plant 40 x 100 ft., two stories and of reinforced concrete construction.

The Oliver Iron Mining Company will establish a hydroelectric plant at Quinnebec Falls, Mich., to furnish power for its Chapin mine. The plans as announced call for the installation of two 2800-h.p. turbines, each to be connected with a three-phase, 60-cycle generator. Two large motor-driven pumps and considerable miscellaneous equipment will also be installed.

R. B. Wagner and associates, Grand Rapids, Mich., have asked for a franchise from the city of St. Clair, Mich., to operate a gas plant. It is proposed to build a central plant at St. Clair to supply that city and a number of adjacent towns.

The Peck Motor Company, Frankfort, Mich., has been organized with $100,000 capital stock to manufacture gasoline engines and motor parts. J. F. Hofstetter, Christian Jacobson, F. O. Wickham and Fred W. Peck are among those interested. It is stated that operations will be begun at once.

The Burden Broom Company, Kalamazoo, Mich., has begun the erection of a two-story addition to its plant. Some equipment will probably be required.

The Michigan Central Railroad Company has awarded contracts for the erection of an addition 92 x 250 ft. to its machine shop at Jackson, Mich. A 30-stall roundhouse, a new tank shop and a new blacksmith shop will also be erected. It is estimated the improvements will cost $100,000.

The Christensen Mfg. Company, Menominee, Mich., has been incorporated with $10,000 capital stock to engage in the general iron and wood manufacturing business.

The Standard Rule Company, Flint, Mich., has increased its capital stock from $25,000 to $40,000.

The Superior Ice Company, Kalamazoo, Mich., has begun the construction of an addition to its plant which will triple its capacity.

The Haskell & Barker Car Company, Michigan City, Mich., is preparing to build extensive additions to its foundry, increasing its capacity for both car wheels and castings.

The Gier & Dail Mfg. Company, Lansing, Mich., manufacturer of metal stampings and steel products, is making additions to its equipment which will increase its capacity 50 per cent. The added space is necessary on account of its growing business and prospects.

Indianapolis

INDIANAPOLIS, IND., March 12, 1913.

The Lindsay Auto Parts Company, Indianapolis, has been incorporated with $250,000 capital stock, to take over the auto parts manufacturing business of Thomas J. Lindsay and handle patents held. The directors are Mahlon E. Bash, Matt W. Lowder and Joseph T. Head. The company states that it is not planning a new factory.

The Indiana Supply Company, Indianapolis, has been incorporated with $150,000 capital stock, to manufacture and deal in plumbing supplies and tools, heating, gas, oil, steam and well fittings and tools. The directors are Hector M. Gilchrist, Bartlesville, and James M. Gilchrist and Frank V. Thomas, Indianapolis.

The Hamden Mfg. Company, Indianapolis, has been incorporated with $35,000 capital stock, to manufacture inner lining for pneumatic tubes. The directors are S. B. Nussbaum, M. Moskin and S. Rubens.

The Superior Court at Indianapolis has ordered receiver George E. Feeney to accept a bid of $307,025.47 for the property of the T. B. Laycock Mfg. Company, made by Aquilla Q. Jones, trustee for the general creditors. The bid of $44,032.13 was also accepted for 13,400 shares of stock of the General Industrial & Mfg. Company, owned by the Laycock Company. The Laycock Company has a large, modern plant for the manufacture of iron and brass beds, springs, etc.

J. Whitney Dissette, having invested in stock of the Noelke-Richards Iron Works, Indianapolis, has been elected treasurer. The company says that the rapid growth of business has caused an enlargement of the official and operating staff.

The Crawfordsville Furniture & Lumber Company, Crawfordsville, Ind., has been incorporated with $75,000 capital stock, to manufacture furniture. The directors are Edward A. Sterzik, Frank C. Evans, Howard Smith, Preston O. Rudy and Lawrence E. DeVor.

The Russellville Heat & Light Company, Russellville, Ind., has been incorporated with $6,000 capital stock, to manufacture lighting appliances. The directors are J. W. Bilbo, C. M. Inge, J. N. Fordice, J. M. Gardner and Romulus Boyd.

The Kells Foundry & Machine Company, East Gary, Ind., has been dissolved.

The Derrickson Mfg. Company has been incorporated at Muncie, Ind., with $125,000 capital stock, to manufacture automobile accessories. The directors are Harry S. Osborn, H. L. Kitselman and R. C. White.

The Elkhart Furniture Works, Elkhart, Ind., has been incorporated with $10,000 capital stock, to manufacture furniture. The directors are Charles A. Olinger, Carl King and Harry W. Gouser.

The Gilderman Mfg. & Foundry Company, Syracuse, Ind., has been incorporated with $15,000 capital stock, to manufacture machinery. The directors are George W. Gilderman and Henry C. Plumbeck of Syracuse and William N. Rumely Charles E. Wolfe and Andrew J. Hickey of Laporte, Ind.

Cleveland

CLEVELAND, OHIO, March 12, 1913.

The demand for single tools, which has been quite active for some time, has quieted down somewhat since the first of the month and business was rather light with dealers in the week. No new inquiry of any size has come out. The only large list in the local market is that of the Marion Steam Shovel Company, which business has been pending for several weeks. In spite of the temporary lull the outlook is good. Reports from local machine tool builders are generally satisfactory. There is a good foreign and domestic demand for turret lathes. The plant of a local maker of hot metal working machinery is well filled with work, having recently taken some good orders from Canadian railroads and car shops. There is a good demand for foundry equipment and supplies.

The Cleveland branch of the National Metal Trades Association has just completed a canvass of business conditions among its members and finds that 76 per cent. report business better than at this time a year ago. Local forge shops and other plants engaged in the manufacture of automobile parts are well filled with orders.

The Lake Shore & Michigan Southern Railroad has just purchased 140 acres at Ashtabula, Ohio, where it plans to begin shortly the erection of shops for the repair of steel cars. The main shop will be 235 x 430 ft., following the erection of which another of the same size will be built. The plans also include a small machine shop, a shop for wheel and axle work, a power house, woodmill and other buildings. This railroad is going ahead with the improvements at Air Line Junction, west of Toledo, that were announced several months ago. Bids have been asked for two roundhouses, aggregating 40 stalls, and specifications will be out shortly for a main car repair shop building. Considerable machinery will be required in a short time for the Air Line Junction shops. Work will go ahead this spring on the Lake Shore shops at Elkhart, Ind., the erection of which was commenced about two years ago, but has since been held up. A large amount of machinery will be required, but it is doubtful if this will be purchased before next year. The power plant is practically completed.

The Cleveland Foundry Company, Cleveland, Ohio, has placed contracts for a large brick and steel factory building to replace one of its present old buildings. The new building will be of brick and steel construction six stories. The company will require some machinery equipment.

The Cleveland Hardware Company, Cleveland, has about completed a large addition to its No. 1 plant on Lakeside avenue, a portion of which is now being occupied. The new building is a brick and steel structure, 80 x 155 ft., five stories and basement. The general offices will be located on the top floor and the remainder of the building will be used for finishing forgings. The portion of the old plant now occupied by offices will be devoted to manufacturing purposes. The bulk of the company's output is drop forgings used in the automobile trade. It is stated that the company has more drop hammers in its two plants than any other drop forging company in the country.

The Cleveland Clutch Company, Cleveland, which will move into a new plant in Ravenna, Ohio, about April 1, will require about 15 machine tools for its new plant, including lathes, boring mills and grinders. Some of these have been purchased and the company is now in the market for the remainder.

A new plant for the manufacture of rubber goods will be established in Alliance, Ohio, by the Alliance Rubber Company, which has been incorporated with a capital stock of $100,000 by George C. Russell, W. H. Purcell, Milton Bejach, M. S. Milbourn, F. E. Dussell, Robert Auld and H. F. Bohecker. The company has acquired a 3-acre site on which a brick building 50 x 150 ft., two stories, will be erected. The company will manufacture a full line of rubber goods with the exception of automobile casings and hard rubber.

The Bryan Show Case Company, Bryan, Ohio, has been incorporated with a capital stock of $42,000 to make bank, house and store fixtures. Among the incorporators are John R. Webber, H. H. Hughes and C. A. Bowersox. The company will rebuild its plant which was recently burned.

The Toledo Steel Barrel Company, 4545 Earl street, will enlarge its plant by the erection of a forge room, an addition to its factory building and an office building.

The West Steel Castings Company, Cleveland, has increased its capital stock from $80,000 to $100,000.

The S. F. K. Steel Barrel Company, now located at 919 West street, Cleveland, will build a new plant on Jones avenue, S. E. The building will be a two-story structure 60 x 115 ft., of milled construction. The company states that for the present it will probably require no additional machinery.

The Williams Test Clamp Company has moved from 224 High avenue, Cleveland, to larger quarters at 5407 Sweeney avenue. The new site will furnish 10,000 sq. ft. of floor space for the plant. The company has added to its product the manufacture of sheet metal stampings. It expects to be in the market shortly for punch presses.

The Yost Furnace Company, Canton, Ohio, has purchased the plant in Canton formerly occupied by the Canton Hughes Pump Company, Canton, Ohio, and will shortly occupy this plant for the manufacture of its line of Canton furnaces. The plant consists of three brick buildings, one 60 x 80 ft., one 44 x 120 ft. and one 45 x 60 ft. The plant is conveniently located on a site 200 x 300 ft. along the Pennsylvania Railroad. It is completely equipped with traveling cranes and well adapted for the purpose for which it will be used.

The Worthington Ball Company, Elyria, Ohio, maker of sporting goods, has been reincorporated with a capital stock of $75,000. The incorporators are George Worthington, Howard Barbour, R. H. Rice and others. Its present plant was recently seriously damaged by fire.

The plant of the W. S. Heller Mfg. Company, Montpelier, Ohio, maker of hardware shelfing, which was burned February 28, will be rebuilt as soon as possible.

A large new plant for the manufacture of metal lath and roofing will be erected in the summer by the Sykes Metal Lath & Roofing Company, Niles, Ohio. A five-acre site has been purchased on Walnut street in Niles for the location of the new plant. When it is completed the company will be able to largely increase its present output.

Cincinnati

CINCINNATI, OHIO, March 11, 1913.

Machine tool manufacturers report improved inquiry from the domestic trade. The export business is holding its own. There has been a let-up in the demand for electrical equipment, although the smaller sizes of generators and motors are fairly good sellers. Boiler and tank makers are very busy, and gas engine manufacturers generally have all they can handle just at present. It is reported that a few of the jobbing foundries are not quite so active as they have been, but this is looked on as merely a temporary condition.

Manufacturers of mechanical stokers will doubtless find a profitable field in Cincinnati before the year has passed. Through the efforts of A. G. Hall, chief city smoke inspector, an ordinance has been recommended that will require all operators of boilers of 200 hp. and over to equip them with automatic stoking devices in order to eliminate the smoke nuisance.

The annual meeting of the Associated Foundries of Cincinnati was held March 3 at the Cincinnati Business Men's Club. The following officers were elected to serve the ensuing year: A. W. Williamson, president; William Gilbert, vice-president; S. M. Blackburn, treasurer; Walter Geier, secretary, and W. S. Dickson, assistant secretary.

James W. Sain & Co., Cincinnati, have leased the former plant of the Brown Fence & Mfg. Company, in Linwood, and will fit it up for the manufacture of brooms. Only a small amount of machinery equipment will be required.

As was recently reported, the Victor Lamp Company, Cincinnati, will soon have plans completed for a large addition to its plant that will be approximately 60 x 200 ft., four stories, and of regular mill construction. The company manufactures automobile lamps and other specialties.

The Ohio Valley Electric Company will erect at Ironton, Ohio, large car barns and a power plant. Nothing is known as to the equipment needed.

The Owl Mfg. Company, Dayton, Ohio, has been incorporated with $25,000 capital stock to manufacture novelties. Charles M. Brehen and C. A. Donovan are named among the principal incorporators.

It is reported that the city of Hamilton, Ohio, will soon make an extensive addition to its waterworks plant, for which power equipment will be required.

The Columbus Bolt Works, Columbus, Ohio, lost considerable valuable machinery by fire last week. The loss was fully covered by insurance and the building destroyed will be rebuilt at an early date.

The proposed new plant of the Ohio Knife Company, Cincinnati, will be 117 x 360 ft., one story and of concrete and brick construction. B. L. Baldwin & Co., Perin Building, drew up the plans, mention of which was made some time ago.

George Helmer, Cincinnati, is having plans prepared for a woodworking shop to be erected on Cavanaugh avenue. Only a small amount of machinery equipment will be required.

The Columbus Railway Supply Company, Columbus, Ohio, has been incorporated with $10,000 capital stock, to handle railway and factory supplies. George A. Johnson is named as one of the principal incorporators.

The Central South

LOUISVILLE, KY., March 11, 1913.

The number of orders for machinery received in the past week is perhaps smaller than for the period immediately preceding, but conditions, generally, remain good. Manufacturing plants are running full time on business already on the books, and dealers report that they have plenty of inquiries which are likely to develop into orders in the immediate future. Railroads in this territory promise to be among the leading purchasers of equipment in 1913. The Louisville & Nashville, which has its general offices here, will spend a large sum in the equipment of shops at Lexington, Ky., and that road and the Burlington, Illinois Central and Big Four will combine in the construction of shops at Paducah, Ky., near the new bridge which is to be built over the Ohio River at Metropolis, Ill.

The Henry Vogt Machine Company, Louisville, has sold a 20-ton ice machine to the Hartford Ice Company, Hartford City, Ind. Cold weather has affected the demand for equipment of this kind, according to the report of the Vogt Company.

The Sutherland Automobile Appliance Company, Louisville, which was organized to manufacture air appliances for motor cars, reports that it is now going ahead with the equipment of a shop of moderate size for the manufacture of its specialty. Luke Sutherland is active manager of the company.

Several iron-working concerns are to be located on a tract of land between New Albany and Jeffersonville, Ind., known in Louisville as the North Side, if the co-operative efforts of the business organizations of the three falls cities are successful. S. A. Tescher and G. W. Watkins, of Indianapolis, are said to be behind the industrial project.

The plant of the Paris Distilling Company, Paris, Ky., was destroyed by fire last week with a loss of $100,000. The plant was owned and operated by the Kentucky Distilleries & Warehouse Company, Louisville. It will probably be rebuilt.

Blanton & Marshall, who have a large sawmill in Harlan County, Ky., have announced plans for the establishment of a woodworking plant of considerable capacity in Middlesboro, Ky., and work on the buildings has begun. The machinery will be operated by electric motors.

W. T. Wendell, of Louisville, is planning the installation of a large stave mill near Hazard, Ky. Power and special equipment will be needed.

John Stice and G. Vincent, Smith's Grove, Ky., are buying machinery for a sawmill.

The City Commissioners of Newport, Ky., are about ready to make a contract for the installation of a garbage disposal plant, which has been under consideration for some time.

Corbin, Ky., which recently sold a bond issue to be used for the construction of water-works, expects to spend $35,000 for this purpose. Detailed plans which have been prepared are in the hands of Thomas F. Young, city clerk.

The Fiscal Court of Lincoln County, Garrard, Ky., is in the market for road-making machinery.

The Kentucky Utilities Company, Lexington, Ky., has purchased the plant of the Middlesboro Electric Light Company, Middlesboro, Ky., for about $100,000. In view of the fact that plans have been made for the establishment of a large central power plant, operated by steam, at Pineville, which is ten miles from Middlesboro, for the operation of coal mines in that district, it is assumed that the Kentucky Utilities Company is interested in the matter. The latter company is going ahead with plans for the installation of an electric light plant at Pleasureville, Ky.

The Rude Bros. Mfg. Company, Liberty, Ind., has been reorganized under the name of the Rude Mfg. Company and the capital stock increased to $300,000. The company plans the enlargement of its plant for the manufacture of grain drills and manure spreaders. S. B. Rude is president of the company.

The Clinchfield Portland Cement Corporation, Kingsport, Tenn., is in the market for a revolving traction shovel. The plant of the company, which recently increased its capital stock, is to be enlarged.

Boilers and other equipment will be purchased by the Crabtree Metal Works, Chattanooga, Tenn., recently incorporated with $5,000 capital stock by B. I. Crabtree and others.

The Bayou Rapides Lumber Company, Alexandria, La., has awarded a contract for the equipment of its new sawmill at that point to the Filer & Stowell Company.

The Eagle Point Power Company has been incorporated at Clarksville, Va., with W. T. Wimbish, president; L. W. Wimbish, vice-president, and H. M. Wimbish, secretary and treasurer.

Birmingham

BIRMINGHAM, ALA., March 10, 1913.

An important machinery dealer in the Birmingham district said: "Business is very satisfactory, especially with regard to engines, boilers and gasoline engines. The sawmill trade is also good. Business in January and February was better than in similar periods in 1912, and March promises the same results. The machine tool business keeps pace with the rest. Very satisfactory is what I would call the state of trade."

The Birmingham Water, Light & Power Company has obtained a 50-year franchise from the Government for the operation of a hydroelectric plant on the Warrior River and plans extensive developments. The company has control of extensive riparian and other rights and franchises. T. H. Friel, Birmingham, Ala., is interested.

The $350,000 plant of the American Radiator Company at North Birmingham is nearing completion and is about ready for the installation of machinery. W. H. Hill, vice-president, inspected the plant last week and expressed satisfaction.

The Paul & Waymer Lumber Company, Jacksonville, Fla., will erect a slack barrel factory with a capacity of 20,000 barrels, at Palatka, Fla.

The Columbus Barrel Company, Columbus, Ga., will rebuild its cooperage plant recently destroyed by fire at a loss of $50,000.

The Ragland Water Power Company, Ragland, Ala., plans to begin construction of a hydroelectric plant on Coosa River with the intention of supplying Ragland, Anniston and other cities. It will raise the Government dam 3 ft. and develop 10,000 hp.

A. A. Northern, Ragland, Ala., contemplates the construction of a cement dam to generate water power on Coosa River. He is receiving estimates on the cost of construction, machinery required, etc.

The Cotton Grader Company, Birmingham, Ala., with a capital stock of $25,000, has been incorporated. It will manufacture cotton seed graders of metal. J. B. Floyd is president. Nathan L. Miller and W. H. Gillespie interested.

The Florida Metal Products Company, Jacksonville, Fla., C. P. Lovell president, will increase the capacity of its plant.

The Smith-Hughes Mining Company, Rome, Ga., has been incorporated with a capital stock of $15,000, by O. R. Smith, B. I. Hughes, Jr., J. E. Dean and others.

The Tampa Electric Company, Tampa, Fla., has plans involving the expenditure of $400,000. It will install a single unit turbine of 4,000 kw. capacity, with necessary boilers, condensers, etc.

The Sugar Valley Brown Ore Mining Company, Chattanooga, has been incorporated with a capital stock of $100,000. F. B. Martin is president-treasurer and H. L. Davis secretary, both of Chattanooga. It has purchased 1,000 acres of ore land in Sugar Valley, Ga., and will build mining plant.

The Attalla Compress & Storage Company will build an electrically-driven cotton ginnery.

The Semet-Solvay Company, Syracuse, N. Y., has begun work on 20 additional ovens at its plant contiguous to the blast furnace of the Central Coal & Iron Company at Holt, Ala.

The Tuscaloosa Railway & Utilities Company, Birmingham, Ala., has been incorporated by C. R. Carter, C. Gannon and W. S. Adams of Birmingham, Ala. The company is allied to interests owning the Bessemer, Ensley & Birmingham Railroad. Will build a gas plant in Tuscaloosa, operate street railroad there and engage in coal carrying business down the Warrior River from Tuscaloosa.

D. W. Atcheson Lumber Company, Chattanooga, Tenn., has been incorporated with a capital stock of $10,000. It will build a mill with a capacity of 20,000 ft. of dressed lumber at Valley Head, Ala.

The DeKalb County Civic Service Company, Philadelphia, will manufacture gas and by-products at Decatur, Ga. Address A. L. Osgood, 132 South Fifteenth street, Philadelphia.

L. H. Locklier, Homerville, Ga., contemplates building an ice plant.

Fairhope Land Company, Savannah, Ga., A. B. Offenbacher manager, plans to install an ice plant.

The Tifton Foundry & Machine Company, Tifton, Ga., will add to its equipment for the manufacture of harrows.

The City of Mebane, N. C., has granted a franchise for power and lights to the Piedmont Electric Company.

The City of Rochelle, Ga., has engaged the J. B. McCrary Company, Atlanta, Ga., to submit estimates on the cost of electric light and water works plant. W. C. Carter, city clerk.

St. Louis

ST. LOUIS, MO., March 10, 1913.

The improvement in the tone of the machine tool market continues steadily. The inquiries are increasingly notable in number, though there have been no exceptional lists to report. The consensus of the feeling is that the change of administration will be without deleterious effect on business; in fact, that the momentum already acquired cannot be checked by any pessimistic sentimentality.

The Polar Wave Ice & Fuel Company has bought a site for a general office building in the central part of the city and has begun work on a branch plant which will contain enough equipment to manufacture the ice necessary for its trade in the suburbs of the city of St. Louis. It is also beginning construction of a plant to cover the needs of the northwestern part of the city.

The Heil Packing Company, St. Louis, has bought a site adjoining its present plant for the construction of a mechanically refrigerated addition to its storage capacity.

The National Bedding Company, St. Louis, has been incorporated with $20,000 capital stock to equip a plant for the manufacture of bedding. The stockholders are E. S. Moskovitz, J. and M. Price.

The Prairie Milling Company, Montgomery City, Mo., with $30,000 capital stock has been incorporated by C. F. Palmer, O. E. Porter, W. L. Hibbert, Charles C. Crump, B. M. Sisk and S. C. Tyler and will equip a milling plant at once.

The George E. Smith Coal Mining Company, Hudson Township, Macon County, Mo., with $52,000 capital stock, has been incorporated by George E. Smith, Andrew H. Clark, Roy D. Conley and John Parker McCanne and will develop and operate coal property owned by them.

The C. O. Biggs Chair Mfg. Co., Dexter, Mo., with

$18,000 capital stock, has been incorporated by C. O. Biggs, J. P. Smith and others and will equip a plant for the manufacture of chairs.

The Mutual Brewing Company, St. Louis, Mo., has increased its capital from $600,000 to $700,000 for the purpose of still further increasing its mechanical equipment and its output capacity.

The Entz Automobile & Battery Company, St. Louis, with $10,000 capital stock, has been incorporated by T. B. Entz, K. S. Walker and A. Von Entz and will equip a plant for the manufacture of batteries, etc.

The Suburban Electric Light & Power Company, St. Louis, has increased its capital stock from $750,000 to $3,750,000 for the purpose of extending its operations and plants.

An issue of $500,000 of bonds has been sold to St. Louis financiers for the Central Clay Drainage District of Clay County, Arkansas, which assures the drainage of about 90,000 acres of land, for which plans have been approved by the Morgan Engineering Company, Memphis, Tenn. Contracts for the work and equipment are yet to be let.

The D. R. Vivion Mfg. Company, St. Louis, with $20,000 capital stock, has been incorporated by D. R. and W. A. Vivion and William F. Rower and will equip a plant for the manufacture of patented and other devices in connection with agricultural equipment.

The American Fire Escape Company, St. Joseph, Mo., with $10,000 capital stock, has been incorporated by Frederick Bielhen, Benjamin Phillip, Romulus E. Culver and others to equip a plant for the manufacture of fire escapes.

The East Oregon Lumber Company, Kansas City, Mo., with $1,250,000 capital stock, has been incorporated by Duval Jackson, George A. Metcalf and I. H. Petty and will equip for extensive lumbering and mill operations.

The interests of Nicholas Pelligreen in the W. A. Miller Elevator Mfg. Company, St. Louis, have been sold to a syndicate of St. Louis and Memphis capitalists which will extensively improve the mechanical equipment of the large plant of the company at Ninth and Victor streets.

The Louisiana Saw Mill Company, Alexandria, La., with $600,000 capital stock, has been incorporated by J. E. Crawford, of Oklahoma City, Okla.; H. B. Crawford of St. Louis and B. H. Miller of Oklahoma City and will begin the construction of a large plant at once. Other stockholders are N. W. McLeod, F. A. Goodrich, T. H. Garret and F. R. Sheldon of St. Louis.

The plant of the Gulf Cotton Compress Company, Argenta, Ark., was burned March 1, with a loss of more than $500,000, including the cotton. The plant will be replaced.

The St. Louis Steel Foundry Company, Wellston, a suburb of St. Louis, with a preliminary capital stock of $2,000, has been incorporated by J. H., C. F. and E. H. Steedman, Walter C. Hecker, J. P. Maloney and W. S. Morrison, all of St. Louis, and will equip a plant shortly.

The Hoover Stove Repair Company, Kansas City, Mo., with $15,000 capital stock, has been incorporated to manufacture parts of stoves and to make repairs and will equip a plant therefor. The stockholders are Charles R. and I. K. Hoover, P. H. Wagner, Samuel Epstein, Arthur S. Nachman and others.

The Camden Power Company, Camden, Ark., under the management of E. T. Reynolds, is reported to be in the market for the extensive increase of its equipment, including boilers, motors, generators, etc. It will consolidate the water and electric light plants of the city.

The Bayer Steam Soot Blower Company, St. Louis, will build a $12,000 addition to extend its facilities for the manufacture of a mechanical device for cleaning boiler tubes, etc. Frank X. Bayer, Louis Boeger and others are stockholders.

The Omaha Township Oil Company, East St. Louis, Ill., has been incorporated with $50,000 capital stock by Frank L. Trasher, M. A. Bright and A. J. Tubbs and will equip and operate oil lands owned by them.

Semi-official announcement is made that the Waters-Pierce Oil Company, St. Louis, has selected Sand Springs, Okla., as a site for a $2,000,000 oil refinery. The completed plant will have 10,000 barrel daily capacity.

The Norwood Canning Plant, Norwood, La., with $15,000 capital stock, has been organized to establish a cannery of 20,000 cans daily capacity at Norwood, under the management of L. W. Blount of State Line, Miss.

George Kimball and J. E. Newton, at Camden, Ark., have plans for the organization of a $1,000,000 corporation to develop coal and clay property and manufacture tanning fluid, creosote oil, etc., as by-products.

An electric light plant is to be built at Arcadia, Mo., under a bond issue which has been voted.

A 500 hp addition to the electric light plant at Joplin, Mo., is to be made under the direction of C. B. Anderson, of that city, engineer in charge. The cost will be $50,000.

A contract for the rehabilitation of the electric plant at Purcell, Okla., has been let to J. W. Kennedy at about $25,000.

The Lake Charles, La., Grain Company will at once erect a plant for the manufacture of feed and will install chopping machinery.

The Johnson Iron Works, New Orleans, La., will equip a $30,000 plant in Algiers, La., doubling the present capacity of the plant.

The Standard Machine Mfg. Company, Carthage, Mo., has increased its capital stock from $30,000 to $60,000 and will double the mechanical capacity of the plant at once.

The G. B. Zigler Company, Jennings, La., with $25,000 capital stock, has been incorporated by G. B. Zigler, W. A. Rowson and N. S. Whisenhunt and will equip and develop oil property controlled by them.

The Davidson-Joplin Mines Company, Alba, Mo., with $250,000 capital stock, has been incorporated by W. H. and G. Davidson and P. F. Maher to operate mining property in the lead and zinc district.

The Producer Mining Company, Joplin Mo., with $30,000 capital stock, has been incorporated by J. M. Mason, E. B. Wilcox and E. N. Cunningham to operate mining property there.

The Blanco Prospecting & Mining Company, Blanco, Okla., with $50,000 capital stock, will develop mining property. The stockholders are Henry and Peter Godfrey, Columbus Taylor, Freeman S. Anderson and R. M. Smith. It is in the market for machinery.

MacDonald & Co., Kansas City, Mo., will build a grain elevator and have placed contract for construction including 200 tons of steel work.

L. H. and A. E. Pyle and J. Hayden have incorporated the Central Broom Mfg. Company, Conway, Ark., and will equip a broom manufacturing plant at once.

The Sapulpa, Okla., Commercial Club has completed arrangements for the equipment there of a plate glass manufacturing plant to be known as the Sapulpa Plate Glass Works.

The East Tennessee Telephone Company, Nashville, Tenn., announces plans for the expenditure of $300,000 in the improvement of the telephone plant at Paducah, Ky., which it owns.

The Michigan Handle Company, Brookhaven, Miss., has been incorporated by William Latta, V. B. Davy and others to equip a plant for the manufacture of handles.

The Globe Packing Box Company, New Orleans, La., is building a $40,000 veneer factory at that place.

Texas

AUSTIN, TEXAS, March 8, 1913.

Preparations are being made by a number of cities and towns to install waterworks plants and lay distributing mains. Many of the older plants are also to be improved. At no time in the history of the State has there been greater interest displayed in municipal progress and improvements. Along with the attention that is being given to providing adequate water supply much is being done in the way of constructing new sewer systems and extending those that are already established. With the prospect of peace being restored in Mexico in the near future, American mine owners in that country are preparing to install a great deal of new machinery and again place their properties on a normal stage of production.

C. C. Teter, of New York, has applied to the Commissioners' Court of Jefferson County for a franchise to lay a waterworks distributing system within a radius of 10 miles of Beaumont. The waterworks plant will be built at some point on the Neches River.

The Magnolia Petroleum Company will lay an oil pipe line from Cushing, Okla., to Alvord, the latter place being situated just below Electra, Texas. The proposed line will be about 200 miles long. It will connect at Electra with the pipe line that runs to Corsicana and Beaumont. Several pumping stations will be installed upon the new line.

The Southwestern Paper Box Company will establish a large factory at Waco for making paper boxes. Oscar Myre is president.

C. A. Pierason, of Axtell, Neb., has purchased the electric light and power plant, the waterworks system and the ice factory at Flatonia, Texas, of the Flatonia Ice, Water & Electric Company. He will make extensive enlargements and improvements.

The Pierce-Fordyce Oil Association will enlarge its oil refinery at Texas City by installing a plant for the manufacture of paraffin wax.

The Cement-Stave-Silo Company, of Des Moines, Iowa, has purchased a site at Fort Worth for its proposed silo factory.

G. A. Bush and K. G. Bush are installing a brick manufacturing plant at Bush, N. M. They will turn out the ordinary red brick, the red pressed brick and a building tile. The plant will have a capacity of 50,000 bricks per day.

The Progressive League of Jefferson is promoting the establishment of a large cotton seed oil mill at that place.

The Dalcoath Mining Company, which has a capital stock of $1,000,000, has acquired a tract of land near Lakewood, N. M., and is preparing to bore a number of wells thereon.

The Tecelots Copper Company will install a smelter at its mines near Carbo, State of Sonora, Mexico. The proposed plant will cost about $200,000. Ricketts & Banks, New York, are the consulting engineers.

The Penn-Sonora Mining Company will install a 50-ton ore reduction plant at its mine near Planchas Plata, State of Sonora, Mexico.

The Mimbres Valley Alfalfa Farms Company has entered into a contract with the Federal Light & Traction Company for the construction of an electric power transmission line from Deming, N. M., to a large tract of land now under development. The power will be used to operate irrigation pumping plants. It is stated that the Federal Company will build a large new electric power station at Deming to cost about $400,000. The Mimbres Valley Company is financed by Pittsburgh men, among those interested being A. A. Corey and H. B. Burnett; G. E. Wisener, Steubenville, Ohio; C. E. Miesse, Chicago; H. V. Olney, Van Wert, Ohio; W. D. Murray, Silver City, N. M., and H. H. Kelly, Deming, N. M.

The Pickering Lumber Company is clearing the site and making other preparations for the erection of its proposed large lumber mill near Joaquin. The plant will have a capacity of 250,000 ft. per day. W. A. Pickering is president.

The Las Adargas Mines of Mexico, Ltd., has adopted plans for a large smelter it will install at its Las Adargas mines near Jiminez, State of Chihuahua, Mexico. Harris Walthall is president and general manager.

The Interstate Cotton Oil Refining Company, which has a capital stock of $600,000, will install a cotton seed oil refining plant at Sherman. The incorporators of the company are C. A. Sanford, H. D. Stinnet and J. M. Satterfield.

The Pacific Coast

SAN FRANCSICO, CAL., March 4, 1913.

The machine tool trade is beginning to take on an appearance of activity, the last fortnight having brought out a very satisfactory volume of general business. While no important lists have recently been submitted to the trade at large, figuring is said to be under way privately on projects from which important business may result. Railroad buying is still a feature, and local dealers derive great encouragement from the amount of interest shown by manufacturing interests in the immediate vicinity.

Buying of miscellaneous machinery is also more active, though buying for contract and corporation work is still the most prominent feature. In view of the revival of mining activity in this and neighboring states, and the amount of highway, railroad and general construction work to be undertaken in the spring, together with a steady development of hydroelectric and irrigation resources, a year of exceptional activity is expected in this line. There has been considerable second-hand machinery of all kinds on the market, but this is rapidly cleaning up, and a preference is shown for first class up-to-date models. Dealers in general supplies note an extraordinary demand for forge outfits for outside work. Inquiries for woodworking equipment are becoming more numerous and a strong demand for logging supplies is expected in the next three of four months. The call for irrigation pumps is running more strongly to the heavier types than for some time, and some heavy orders for all types of dredging machinery are expected.

The railroad dissolution has been a matter of much speculation. According to one report, the Central Pacific will take the shops at Sacramento and the Southern Pacific shops at Los Angeles will be enlarged. This, however, is not certain. The Southern Pacific is still making frequent purchases, having ordered a 42-in. Niles car-wheel borer for the Sacramento shop and a lot of lathes and other tools for the shop at Portland, Ore.

The Paine Bolt Works, this city, has been making a number of improvements and is installing several new tools.

Tentative figures are being taken on a number of tools for the Standard Oil Company and an inquiry is reported from the Ocean Shore Railroad.

The Yuba Consolidated Goldfields, San Francisco, is getting in machinery for the new dredge, Yuba 14, which will be entirely of steel, with 15½-ft. buckets, and will dig to a depth of 65 ft. Electric power equipment will have a total capacity of 900 h.p.

The Oro Development Company, Belden, Cal., has purchased a steam hammer from Harron, Rickard & McCone, this city.

The Riverside Industrial Shop, Riverside, Cal., is putting in several machine tools, woodworking machines, etc.

It is reported that new plants will soon be built at Richmond, Cal., by the Gageweight Scale Company and the Sterling Fixture & Showcase Company.

The Southwest Foundries Company, San Diego, Cal., has been incorporated with a capital stock of $10,000 by R. H. Baker, Fred Baker and J. D. Johnson.

The Moore & Scott Iron Works is planning to increase the capacity of its boiler shops on Second street, this city.

It is announced that the T. H. Benton box factory, Redding, Cal., recently burned, will be rebuilt shortly.

Carl Leonhardt, Los Angeles, has purchased a gypsum property near Las Vegas, Nev., on which he will shortly erect a mill.

A fire in Oakland recently burned out the Frauneder Iron Works and the Oakland Elevator Works.

It is reported that the United Iron Works, of Oakland, will soon install a number of new tools.

The Martinez-Benicia Ferry Company is taking figures on the construction of a sidewheel ferry steamer with oil-burning steam engines.

The Pacific Metal Products Company and the F. L. Moore Motor Truck Company have been consolidated under the former name, with a capital stock of about $1,250,000. A large motor truck factory at Torrence, Cal., is projected.

The Chamber of Commerce has started a movement for the abatement of the smoke nuisance, and has named a committee to secure co-operation of the engineers of mechanical plants through the city. Later it is proposed to submit an ordinance regulating the firing of furnaces.

The W. C. Hendrie Rubber Company, Denver, Colo., has purchased a site of six acres in Torrence, a suburb of Los Angeles, Cal., and is erecting a plant at that place for the manufacture of automobile tires. The building is designed to take care of the company's Coast trade and will cost about $100,000.

Canada

TORONTO, ONT., March 8, 1913.

Smart Woods, Ltd., Montreal, has acquired the business and property of the Montreal Tent & Awning Company. The purchase was ratified at a special meeting of shareholders. W. H. Griffin, proprietor of the Tent & Awning Company will join the larger organization as manager of the tent and awning factory. The financing was carried out by exchange of securities.

The by-law to bonus the Ecothermal Stove Company by exemption from taxation of a five-acre site and a loan of $10,000 was carried at Kingsville, Ont., March 3. The company hopes to have its factory operating before fall.

Fire damaged the Riordon Paper Company's mills at Merritton, Ont., March 2, to the amount of $150,000. The insurance covers the loss.

The Niagara, St. Catharines & Thorold Railway Company will build a new power station at St. Catharines and equip it with two 500 kw rotary converters and transformers which it has ordered from the Canadian General Electric Company and the company has also purchased a 750 kw rotary converter and transformer for the operation of its Niagara-on-the-Lake extension.

The Canadian Division of the Beaver Company, Buffalo, manufacturer of Beaver board fibre, etc., has

purchased a 24-acre site at Beaver dam, Thorold, Ont., on which it will erect a plant to cost between $300,000 and $400,000. The company will use Niagara Falls power and has closed a contract for its first unit of 2800 hp. expecting to use eventually 6,000 hp. It will also utilize 500 hp. which it will generate in its boilers used for the treatment of fibre pulp, etc.

The Richard Wilcox Canadian Company, Ltd., London, Ont., has been granted incorporation papers with an authorized capital stock of $70,000 to engage in the manufacture of builders' hardware, etc., and a plant for the purpose will be built and equipped. William R. Yendall, William A. Fitch and Lee Mighell are the provisional directors.

The Tate Electric Company, Ltd., Montreal, will build at Walkerville, Ont., a factory building 60 x 250 ft., two stories and basement, of structural steel and brick.

The Canadian Alkali Company has been incorporated with $2,000,000 capital stock and has purchased a tract of over 50 acres at Sandwich, Ont. It will erect a plant there for the manufacture of salt and allied products, including caustic soda and bleaching powder, by a chemical process patented by Howard M. Dubois, a chemical engineer of large experience. With one exception the men heading the new industry are Detroit capitalists, including James Inglis, president; William McBain, of Toronto, vice-president; M. G. Borgman, treasurer, and H. S. Dodson, secretary and general manager. The board of directors comprises the men named and A. L. Stephens. The company will open an office in Windsor, Ont.

The brass foundry of the McKinnon Dash Company, St. Catharines, Ont., was entirely destroyed by fire March 8, entailing a loss of $50,000. Six hundred men are temporarily thrown out of employment until the foundry can be rebuilt and equipped.

Industrial Commissioner Brown of Moose Jaw, Sask., is in communication with the head of a company that proposes to establish a linseed oil grinding mill and an oil cake factory in that city. It is stated that the capital stock of the company is between $1,500,000 and $2,000,000.

Government Purchases

WASHINGTON, D. C., March 10, 1913.

The War Department, United States Engineer office, custom house, New Orleans, La., will open bids March 20 for delivery f.o.b. wharf, New Orleans, for dredging machinery to be used on a gravity swing dredge. The equipment required includes one double-cylinder engine, 70-hp., five drums and three auxiliary drums, standard stationary locomotive boiler of 100 nominal horsepower, to be supplied with one Lidgerwood projector, two feed pumps, horizontal duplex double action to work at 200 lb. pressure, feed water heater with oil separator and a water purifier.

The Treasury Department, Washington, will open bids March 28 for the installation complete of an electric passenger elevator in the United States post office and court house, Charleston, W. Va.

The following bids were opened March 5 by the Bureau of Supplies and Accounts, Navy Department, Washington, for materials and supplies:

Schedule 5163, class 21, two fuel oil pumps—Bidder 3, Allentown Rolling Mills, Allentown, Pa., $4,506.50 and $3,303, alternate; 17, Blake & Knowles Steam Pump Works, New York, $2,775, $2,375 and $4,400; 59, Fairbanks, Morse & Co., Seattle, Wash., $2,276.

Schedule 5182, class 41, one open-side planer—Bidder 50, Dedrick & Harvey Machine Company, Baltimore, Md., $928; 76, Kemp Machinery Company, Baltimore, Md., $2,119.75. Class 42, one No. 0 side horizontal drilling, boring and milling machine—Bidder 50, Dedrick & Harvey Machine Company, Baltimore, Md., $2,615; 112, Prentiss Tool & Supply Company, New York, $2,745.

Schedule 5183, class 51, one vertical simplex, feather-weight, double-acting suction valveless air pump—Bidder 17, Blake & Knowles Steam Pump Works, New York, $884; 42, M. T. Davidson Company, Brooklyn, N. Y., $600.

Schedule 5194, class 116, three valve-reseating machines—Bidder 10, F. A. Brander & Co., New York, $325; 58, Frevert Machinery Company, New York, $325; 68, Industrial Instrument Company, New York, $325; 74, Knox & Bro., New York, $325; 76, Kemp Machinery Company, Baltimore, Md., $325; 86, Leavitt Machine Company, Orange, Mass., informal; 87, Manhattan Supply Company, New York, $325; 91, Manufacturers' Agency & Sales Company, New York, $325; 94, Montgomery & Co., New York, $325; 99, McArdle & Cooney, Philadelphia, Pa., $325; 133, R. B. Sherman, New York, $325; 134, Thomas Summerville Company, Washington, D. C., $325; 142, Universal Trading Company, New York, $325; 156, F. S. Banks & Co., New York, $325; 157, Rawles, Cobb & Co., Boston, Mass., $325.

Schedule 5200, class 141, four convertible steel plate fans and one complete set of spare parts—Bidder 38, Clarage Foundry & Mfg. Company, Kalamazoo, Mich., $3,014.50; 43, Diehl Mfg. Company, Elizabethport, N. J., $3,488.70 and $3,700, alternate; 62, General Electric Company, Schenectady, N. Y., $3,420.75; 128, B. F. Sturtevant Company, Hyde Park, Mass., $3,402.

Trade Publications

Lathes.—R. K. LeBlond Machine Tool Company, Cincinnati, Ohio. Catalogue. Size, 6 x 9 in.; pages, 156. Features a number of new and important steps in the design of engine lathes. Following a list of the various types of lathes manufactured, a general description of the heavy duty lathe is given, succeeded by illustrations and condensed specifications of the various sizes of tools. The same arrangement is followed for the company's quick change and standard engine lathes and space is then given to the various turrets, rests, tool posts and other attachments which can be supplied. Foundation diagrams of the standard and heavy duty lathes are given with dimensions, and mention is made of milling, cutter and tool grinding and an automatic rack cutting machine. A complete telegraphic code and an index are included.

Threading Machinery.—Landis Machine Company, Inc., Waynesboro, Pa. Catalogue No. 21. This is the company's 1913 catalogue describing and illustrating a complete line of bolt, pipe and nipple threading, bolt pointing and nut tapping machinery, screw cutting die heads and special threading machines. After a discussion of the special features of the Landis die and the action of the chasers, a rotary die head and bolt cutter die head are described. Following this, descriptions of the various machines are given, a single page being devoted to each. The various parts of the rotary die head and of the bolt and nipple threading machines are shown with numbers for convenience in ordering repairs. A telegraph code and a complete index are included. Among the machines illustrated are a 1½-in. staybolt cutting machine and a ½-in. double head bolt cutting machine, both of which were illustrated in *The Iron Age*, August 3, 1911.

Furnaces.—W. S. Rockwell Company, 50 Church street, New York City. Bulletin No. 18. Deals with a new semi-producer furnace which is designed to use low priced coals, thus giving the advantages of producer gas furnaces without the usual producer equipment. These furnaces are intended to be used in situations where the price of oil fuel is too high and as a substitute for furnaces using powdered coal or producer gas. The furnace is a combination of a furnace and a gas producer, thus giving a small, simple, self-contained and easily handled unit.

Electric Drilling Machines.—Standard Electric Tool Company, Cincinnati, Ohio. Bulletins D-8 and D-9. Describe a new line of high power electric drilling machines for use on direct and alternating current circuits. The former contains a description of the machine for direct current, and the latter describes the same machine when fitted with two and three phase alternating-current motors.

Grinding Machine.—St. Louis Machine Tool Company, St. Louis, Mo. Circular. Gives general description and specifications for a grinding machine having a self-contained countershaft. The special advantages claimed for this type of machine, which was illustrated in *The Iron Age*, November 14, 1912, are smooth running, elimination of belting and convenience in locating the machine. One of the distinctive features of the machine, aside from the novel type of countershaft, is a belt tightening device on the countershaft frame, which is attached to the column by milled square gibs and adjusted by a screw.

Adjustable-Speed Motors.—Triumph Electric Company, Cincinnati, Ohio. Bulletin No. 1010, superseding No. 371. Discusses briefly the operating characteristics of motors designed for machine tool applications. The advantages of individual motor drive, such as increased output, saving in power, flexibility in arrangement of machines, facility in serving machines and cleaner, lighter and healthier operating conditions are next touched upon, after which there is a complete description of the construction of these motors which are built in standard sizes from ¼ hp. upward with speed ratios of 1 to 2, 1 to 3 and 1 to 4. The text of the description is supplemented by illustrations of the various special features and a wiring diagram and illustrations of the application of the motor to various machine tools are included.

Rotary Pumps.—Goulds Mfg. Company, Seneca Falls, N. Y. Bulletin No. 113. Calls attention to an extensive line of rotary pumps that can be adapted to almost any service where the required capacity and pressure are within their ratings. Among the services for which they are more commonly used are fire protection, circulating cooling water for gas engines, portable service on road oilers, tank cars, concrete mixers, and pumping oils, chemicals, gasoline and kerosene, etc. The various pumps, which range from small hand units to large ones designed for belt or direct-connected electric motor drives, are illustrated and briefly described with condensed tables of specifications.

Pneumatic Tools.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 130. Devoted to the subject of the lubrication of pneumatic tools and describes the oil and grease lubricants of this company as well as the devices which it is prepared to furnish. These include an automatic oiler for use in connection with pneumatic hammers and piston and rotary drilling machines and a grease machine which forces the grease into the dead handle opening of a drilling machine. Where the automatic oiler is used it is recommended that it be placed about 20 in. from the tool with oilproof hose between.